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ABSTRACT

This guide is intended to help applicants prepare for the Commercial Airplane Pilot Written Test. The guide outlines the aeronautical knowledge requirements for a commercial pilot, informs the applicant of source material that can be used to acquire their knowledge, and includes test items and illustrations representative of those used in the FAA-administered test. (Author)

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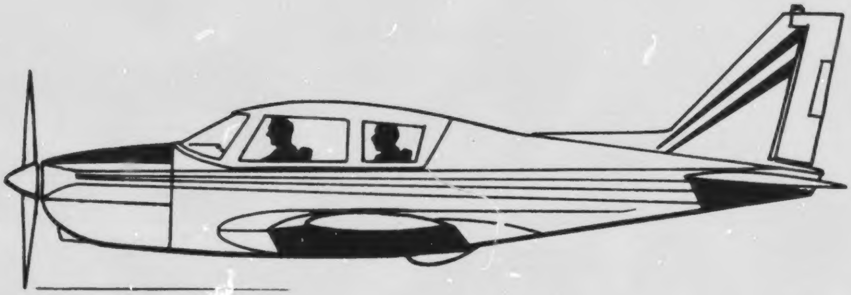
AC 61-71B

COMMERCIAL PILOT-AIRPLANE

Written Test Guide



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REVISED
1979

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U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

COMMERCIAL PILOT

AIRPLANE

WRITTEN TEST GUIDE

REVISED
1979

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Flight Standards Service

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PREFACE

The Federal Aviation Administration has developed this guide to help applicants prepare for the Commercial Pilot-Airplane Written Test. It supersedes AC 61-71A, Commercial Pilot-Airplane Written Test Guide, dated 1977.

This guide outlines the aeronautical knowledge requirements for a commercial pilot, informs the applicant of source material that can be used to acquire this knowledge, and includes the test items and illustrations representative of those used in the FAA Commercial Pilot-Airplane Test.

The test items in this guide are based on regulations, principles, and practices that were current at the time this publication was printed. Periodically this guide is revised.

Test items in the FAA written tests are updated as soon as possible when the need arises, consequently FAA written test items may vary from those contained herein.

The FAA does not supply the correct answers to questions included in this guide. Students should determine the answers by research and study, by working with instructors, or by attending ground schools. The FAA is in no way responsible for the contents of commercial reprints of this publication nor the accuracy of answers they may list.

Comments regarding this publication should be directed to the U. S. Department of Transportation, Federal Aviation Administration, Flight Standards National Field Office P.O. Box 25082, Oklahoma City, Oklahoma 73125.

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COMMERCIAL PILOT AIRPLANE WRITTEN TEST GUIDE

INTRODUCTION

This guide is offered as an aid to assist persons in obtaining the necessary knowledge to pass the written test. There is NO quick and easy way to obtain the background of experience, knowledge, and skill that the present-day professional pilot must possess. In the many areas where technological change is the rule rather than the exception, there can be no substitute for diligent study to develop competence and remain current.

The intent of this guide is to define and narrow the field of study to the knowledge requisite to the Commercial Pilot Certificate. Thus, the applicant is more able to direct an effective study plan. The applicant is reminded, however, THAT FULL KNOWLEDGE OF ALL TOPICS MENTIONED IN THE STUDY OUTLINE – NOT JUST A MASTERY OF THE TEST ITEMS – SHOULD BE USED AS THE BASIS FOR DETERMINING THAT ONE IS PROPERLY PREPARED TO TAKE A WRITTEN TEST.

NEED FOR THE WRITTEN TEST

Technological advances and refinement have made the modern airplane versatile, reliable, and efficient, thereby expanding the phases of air commerce in which the commercial pilot may become involved. Consequently, situations are often encountered involving rapidly changing conditions which demand full knowledge of the airplane and the environment in which it will be operated.

The increased use of more advanced and refined aircraft by the general aviation segment has outmoded the practice of testing for memory alone. Of course, knowledge is still necessary but it must be related to skill. Therefore, written examinations today require the ability to use knowledge in practical situations as well as in answering questions based on theoretical problems.

TYPE OF TEST QUESTIONS

The written test contains "objective, multiple-choice" type test items that can be answered by a single response selected from the four presented. This type of test has several advantages, two of which are (1) *objective scoring*, eliminating any element of subjective judgment when determining the grade, and (2) *rapid scoring*, making it possible for the applicant to receive the grade quickly.

TAKING THE WRITTEN TEST

At present there are 60 items on the commercial written test. The maximum time allowed for completion is 4 hours. While it may be possible to complete the test in less time, it may increase the probability of mistakes.

Applicants are encouraged to adhere to the following guidelines when taking the test:

1. Each statement means exactly what it says. Do not look for hidden meanings. The statement does not concern exceptions to the rule; it refers to the general rule.
2. Always read the statement or question first – before looking at the answers. Be sure to read the entire item carefully. Avoid "skimming" and hasty assumptions as this may lead to an erroneous approach to the problem or failure to consider vital words.
3. Only *one* of the alternate answers given is completely correct. The others may be the result of incorrect computation, misconceptions of rules and principles, or erroneous or incomplete analysis of the problem. Be sure to consider and understand all factors.
4. Each test item is independent of other test items. The correct response to one item is not based on the correct response to a previous test

question, although occasionally the same factors may be used.

5. Applicants are encouraged to skip items which they cannot readily answer. You can return to the items you skipped after completing those which you can readily answer. This procedure will enable you to make maximum use of the time available, and may mean the difference between a passing or failing score.
6. In solving problems, select the answer closest to your solution. If you have solved the problem correctly, your solution will be nearest to the correct answer.

ELIGIBILITY FOR TAKING THE TEST

The prerequisites for taking the initial written test are prescribed in FAR Part 61.35. The requirements for retaking the test in the event of failure are prescribed in FAR Part 61.49. When arriving for the written test, you should be prepared to present to the person administering the test proof of your eligibility to take it, as well as documentary evidence of your identity. Normally, you will not be permitted to begin the test unless there is maximum allowable time available for taking the test.

RECOMMENDED STUDY MATERIALS

The following lists the essential reference materials developed by the *U. S. Department of Transportation*, but does not include all the useful material that is available. Other excellent textbooks, audio-visual training aids, and instructional materials produced commercially may be obtained from various bookstores, and fixed-base operators engaged in flight training.

List of Publications

ADVISORY CIRCULARS

FAA Advisory Circulars inform the aviation public in a systematic way of nonregulatory material of interest. Each circular issued is listed numerically within its subject-number breakdown which corresponds to the subject area of the Federal Aviation Regulations. Most of the recommended study materials listed in this guide are issued as advisory circulars.

Before ordering FAA Advisory Circulars it is advisable to obtain a copy of AC 00-2, Advisory Circular Checklist. AC 00-2 lists advisory circulars that are for sale as well as those available free of charge from the Federal Aviation Administration. It also contains complete titles, a brief description of the contents of each advisory circular, and ordering instructions.

To obtain a free copy of AC 00-2 send a request to:

U. S. Department of Transportation
Publication Section M-443.1
Washington, D.C., 20590

It is recommended that the Commercial Pilot applicant obtain Advisory Circulars in at least the following subjects:

Subject Number and Subject Matter

00	*General*
20	*Aircraft*
60	*Airmen*
70	*Airspace*
90	*Air Traffic Control and General Operations*
140	*Schools and Other Certificated Agencies*

FLIGHT TRAINING HANDBOOK. AC 61-21. SN 050-007-00008-1. Provides information and direction in the introduction and performance of training maneuvers for student pilots, pilots who are requalifying or preparing for additional ratings, and for flight instructors.

PILOT'S HANDBOOK OF AERONAUTICAL KNOWLEDGE. AC 61-23A. SN 050-011-00051-8. Contains essential, authoritative information used in training and guiding private pilots, and covers most subject areas in which an applicant may be tested. Tells how to use the Airman's Information Manual, the data in FAA-approved airplane flight manuals, and the basic instruments.

PLANE SENSE. AC 20-5D. Acquaints the prospective airplane owner with certain fundamentals of owning and operating an airplane. It is free upon request.

PILOT'S WEIGHT AND BALANCE HANDBOOK. AC 91-23A. SN 050-007-00405-2 Provides an easily understood text on aircraft weight and balance. It progresses from an explanation of fundamentals to the application of weight and balance principles in aircraft operations.

WAKE TURBULENCE. AC 90-23D. Presents information on the subject of wake turbulence and suggests techniques that may help pilots avoid the hazards of wingtip vortex turbulence. It is free upon request.

TERRAIN FLYING. AC 91-15. SN 050-007-00147-9. Contains observations, opinions, warnings, and advice from veteran pilots regarding flight over various types of terrain throughout the U.S.

MEDICAL HANDBOOK FOR PILOTS. AC 67-2. SN 050-007-00254-8. An aviation medicine handbook written in pilots' language that provides guidance on when, and when not, to fly. Emphasizes the fact that a good pilot must be physically fit, psychologically sound, and well trained.

FEDERAL AVIATION REGULATIONS (FARs). The FAA publishes the Federal Aviation Regulations to make readily available to the aviation community the regulatory requirements placed upon them. These regulations are sold as individual Parts by the Superintendent of Documents.

The more frequently amended Parts are sold on subscription service (that is, subscribers will receive Changes automatically as issued), while the less active Parts are sold on a single-sale basis. Changes to single-sale Parts will be sold separately as issued. Information concerning these Changes will be furnished by FAA through its "Status of the Federal Aviation Regulations, AC 00-44." Instructions for ordering this free status list are given in the front of each single-sale Part.

Check or money order made payable to the Superintendent of Documents should be included with each order. Submit orders for single-sales and subscription Parts on different order forms. No COD orders are accepted. All FAR Parts should be ordered from: Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

The suggested Parts for study are:

Part 1, *Definitions and Abbreviations.*

Part 23, *Airworthiness Standards — Normal, Utility, and Acrobatic Category Airplanes.*

Part 61, *Certification: Pilots and Flight Instructors.*

Part 71, *Designation of Federal Airways, Area Low Routes, Controlled Airspace and Reporting Points.*

Part 91, *General Operating and Flight Rules.*

Part 135, *Air Taxi Operators and Commercial Operators of Small Aircraft.*

FLIGHT INFORMATION/OPERATIONAL PUBLICATIONS

Airman's Information Manual (AIM). This manual is designed to provide airmen with basic flight information and ATC procedures for use in the National Airspace System (NAS) of the U. S. It also contains items of interest to pilots concerning health and medical facts, factors affecting flight safety, a pilot/controller glossary of terms used in the Air Traffic Control System, and information on safety, accident and hazard reporting.

This manual is complimented by other operational publications which are available upon separate subscription. These publications are:

Graphic Notices and Supplemental Data. A publication containing a tabulation of Parachute Jump Areas; Special Notice Area Graphics; Terminal Area Graphics; Terminal Radar Service Area (TRSA) Graphics; and other data, as required, not subject to frequent change. This publication is issued quarterly.

Notices to Airmen. A publication containing current Notices to Airmen (NOTAMs) which are considered essential to the safety of flight as well as supplemental data affecting the other operational publications listed here. This publication is issued every 14 days.

Airport/Facility Directory. This publication contains information on airports, communications, navigational aids, instrument landing systems, VOR receiver checkpoints, FSS/Weather Service telephone numbers, and various other pertinent special notices. These publications are available upon subscription from the National Ocean Survey (NOS), Distribution Division (C-44), Riverdale, Maryland 20840.

NATIONAL TRANSPORTATION SAFETY BOARD PART 830. This publication deals with procedures required in the notification and reporting of accidents and lost or overdue aircraft within the United States, its territories, and possessions. It is free upon request from the National Transportation Safety Board, Publications Branch, Washington, D. C. 20594.

VFR/IFR PILOT EXAM-O-GRAMS. Provide brief explanations of important aeronautical subjects. These include concepts and procedures critical to aviation safety, common misconceptions among pilot applicants, and areas which cause general difficulty in written tests. Exam-O-Grams are free and may be obtained by contacting U. S. Department of Transportation. Federal Aviation Administration, Flight Standards National Field Office, AFS-590, P. O. Box 25082, Oklahoma City, Oklahoma 73125.

AIRPLANE FLIGHT MANUALS AND PILOT'S OPERATING HANDBOOKS. Aircraft manufacturers issue manuals for each aircraft model. They may be obtained from aircraft manufacturing companies or possibly from local airplane dealers and distributors.

How to Obtain Publications Sold by Sup't. Doc's.

1. Use an order form (not a letter unless absolutely necessary) when ordering Government publications. Order forms may be duplicated or obtained *free* upon request from:

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

2. Send separate orders for subscription and nonsubscription items.
3. Give the exact name, Advisory Circular identification number, and stock number when ordering publications.
4. Send a check or money order for the *exact* amount made out to the Superintendent of Documents; DO NOT SEND CURRENCY. (Include an additional 25% to cover postage for foreign mailing.)
5. If a letter is used to request publications, enclose a self-addressed mailing label.

6. All prices are subject to change. The latest Advisory Circular Checklist, AC 00-2, should be consulted for current pricing of publications. It is important that the *correct* amount be enclosed with the order.

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STUDY OUTLINE

The study outline which follows is the framework for basic aeronautical knowledge that the prospective commercial pilot should know. Each question on the FAA written test can be directly related to one or more of the topics contained in this outline. This subject matter is based on operationally realistic airman activity and encompasses the requirements specified in FAR 61.125.

I. Federal Aviation Regulations

- A. 14 CFR Part 1: Definitions and Abbreviations
    - 1. General definitions
    - 2. Abbreviations and symbols
- B. 14 CFR Part 61: Certification: Pilots and Flight Instructors.
    - 1. Required certificates/ratings
    - 2. Certificates and ratings issued
    - 3. Carriage of narcotic drugs
    - 4. Duration of pilot certificates
    - 5. Duration of medical certificates
    - 6. General limitations
    - 7. Pilot logbooks
    - 8. Operations during medical deficiency
    - 9. Second-in-command qualifications
    - 10. Recent experience: pilot in command.
    - 11. Pilot-in-command proficiency check
    - 12. Commercial pilot privileges/limitations
- C. 14 CFR Part 91: General Operating and Flight Rules.
    - 1. Subpart A–General
        - a. Responsibility and authority of the pilot in command.
        - b. Pilot in command of aircraft requiring more than one required pilot.
        - c. Preflight action
        - d. Flight crewmembers at stations.
        - e. Interference with crewmembers.
        - f. Careless or reckless operation.
        - g. Liquor and drugs
        - h. Dropping objects
        - i. Fastening of safety belts.
        - j. Parachutes and parachuting
        - k. Portable electronic devices
        - l. Fuel requirements for flight under VFR
        - m. ATC transponder equipment
        - n. Civil aircraft: certifications required
        - o. Civil aircraft airworthiness
        - p. Civil aircraft operating limitations and marking
        - q. Supplemental oxygen
        - r. Powered civil aircraft instrument and equipment requirements.
        - s. Flight recorders and cockpit voice recorders.
        - t. Automatically reported pressure altitude data and the pilot's altitude reference
        - u. Restricted category civil aircraft; operating limitations.
        - v. Limited category civil aircraft; operating limitations
        - w. Provisionally certified civil aircraft; operating limitations
        - x. Aircraft having experimental certificates: operating limitations.
        - y. Emergency exits for airplanes carrying passengers for hire
        - z. Emergency locator transmitters
    - 2. Subpart B–Flight Rules
        - a. Waivers
        - b. Operating near other aircraft
        - c. Right-of-way rules; except water operations
        - d. Aircraft speed
        - e. Acrobatic flight
        - f. Aircraft lights
        - g. Compliance with ATC instructions
        - h. ATC light signals.
        - i. Minimum safe altitudes; general
        - j. Altimeter settings
        - k. Flight plan; information required
        - l. Flights between Mexico or Canada and the United States
        - m. Operating on or in the vicinity of an airport; general rules

n. Operation at airports with operating control towers
o. Operation at airports without control towers.
p. Terminal control areas
q. Temporary flight restrictions
r. Flight test areas
s. Restricted and prohibited areas
t. Positive control areas and route segments
u. Flight restrictions in the proximity of the Presidential and other parties
v. Basic VFR weather minimums
w. Special VFR weather minimums
x. VFR cruising altitude or flight level

3. Subpart C – Maintenance, Preventive Maintenance, and Alterations

a. Maintenance required
b. Carrying persons after repairs or alterations
c. Inspections
d. Altimeter system tests and inspections
e. Progressive inspection
f. Maintenance records
g. Transfer of maintenance records
h. Rebuilt engine maintenance records
i. ATC transponder tests and inspections

4. Subpart D – Large and Turbine-powered Multiengine Airplanes

a. Flying equipment and operating information
b. Operating limitations and emergency equipment
c. Equipment requirements: over-the-top, or night VFR operations.

d. Survival equipment for overwater operations.
e. Radio equipment for overwater operations.
f. Emergency equipment.
g. Flight altitude rules.
h. Smoking and safety belt signs.
i. Passenger briefing.
j. Carry-on baggage.
k. Carriage of cargo
l. Transport category airplane weight limitations.
m. Operating in icing conditions
n. Flight engineer requirements
o. Second in command requirements
p. Flight attendant requirements
q. Inspection program
r. Availability of inspection program

D. 14 CFR Part 135: Air Taxi Operators and Commercial Operators of Small Aircraft.

1. Applicability
2. Operating rules
3. Crewmember qualification
4. Aircraft and equipment

II. 49 CFR Part 830: Rules pertaining to the Notification and Reporting of Aircraft Accidents or Incidents.

A. Applicability
B. Definitions
C. Immediate notification and information
D. Preserving wreckage /mail /cargo /records
E. Reports/statements to be filed

III. FAA Advisory Circulars.

A. Series 00–General
B. Series 20–Aircraft
C. Series 60–Airmen
D. Series 70–Airspace
E. Series 90–Air Traffic Control and General Operations
F. Series 120–Air Carrier and Commercial Operators
G. Series 150–Airports
H. Series 170–Air Navigation Facilities

IV. FLIGHT INFORMATION/OPERATIONAL PUBLICATIONS.

A. AIM–Basic Flight Information and ATC Procedures.

1. Pilot controller glossary
2. Airport lighting/marking/aids

3. Air navigation radio aids
4. VOR (VHF omnidirectional range)
5. VOR receiver check
6. VHF direction finder
7. Radar
8. Visual approach slope indicator (VASI)
9. Rotating beacons
10. Runway markings
11. Controlled/uncontrolled airspace
12. Operating at nontower airports
13. Special use airspace–prohibited, restricted, alert areas, military operations areas.
14. Services available to pilots
15. Aeronautical advisory stations (UNICOM, MULTICOM)
16. Automatic terminal information service (ATIS)
17. ATC departure/en route/arrival procedures.
18. Radar traffic information service
19. Transponder operation
20. Terminal control area
21. Terminal radar program for VFR aircraft
22. Airport operations/tower controlled airports/nontower airports
23. Radiotelephone phraseology/technique
24. Light signals
25. Traffic/wind direction indicators-/taxiing
26. VFR flight plans
27. Altimetry
28. ADIZ and designated mountainous areas
29. Wake turbulence
30. Pilot/controller roles/responsibilities
31. Medical facts for pilots
32. Fatigue
33. Hypoxia
34. Hyperventilation
35. Alcohol
36. Carbon monoxide
37. Good operating practices
38. Safety, accident, and hazard reports
39. Emergency procedures

B. Graphic Notices and Supplemental Data.

   1. Parachute jumping areas
   2. Military training routes
   3. Special operation military training routes
   4. Terminal area graphic notices
   5. Terminal radar service areas (TRSAs)

C. Notices To Airmen (NOTAMS).

   1. Extended NOTAMS
   2. FDC NOTAMS
   3. Special NOTAMS

D. Airport/Facility Directory.

   1. Abbreviations
   2. Legend
   3. Special Notices
   4. VOR Receiver Check Points
   5. Aeronautical Chart Bulletin
   6. Enroute Flight Advisory Service

V. Aerodynamics and Principles of Flight.

A. Laws of motion
B. Functions of the flight controls
C. Principles of airfoils
D. Wing platform–
   1. Area/span/chord
   2. Aspect ratio/taper/sweepback
   3. Effect of planform on stall patterns
E. Forces acting on the aircraft
F. Flight controls/axes of the aircraft
G. Lift/drag during turns
H. Lift versus angle of attack
I. Lift/thrust versus air density
J. Types of flaps, spoilers, divebrakes
K. Effect of flaps on lift/drag/trim
L. Effect of ice/snow/frost on airfoils
M. Power versus climb/descent/level flight
N. Gyroscopic precession
O. Types and effect of drag–induced/parasite/profile
P. Ground effect
Q. Loads/load factors
R. Stability–static and dynamic/longitudinal/lateral/directional
S. Stalls/spins

T. Relative wind/angle of attack
U. Effect of wind during turns
V. Torque effect–P factor
W. Flight Envelope

VI. Aircraft/Engine Operation – General.

A. Fuel injection/carburetor principles
B. Reciprocating engine principles
C. Preflight/postflight safety practices
D. Use of mixture/throttle/propeller control
E. Use of proper fuel grade/type
F. Fuel system operation
G. Engine starting/shutdown
H. Detonation cause/effect
I. Fuel contamination prevention/elimination
J. Emergency–engine/systems/equipment/fire
K. Carburetor icing cause/detection/elimination
L. Wake turbulence causes/precautions
M. Proper loading of the aircraft
N. Interpreting engine instruments
O. Ignition or electrical system/units
P. Recovery from critical flight situations
Q. Effect of carburetor heat on mixture
R. Aircraft operating limitations
S. Manifold pressure versus RPM
T. High altitude operations/pressurization
U. Use of oxygen and oxygen equipment
V. Mid-air collision avoidance precautions

VII. Aircraft/Engine Performance–General.

A. Takeoff charts
B. Rate-of-climb charts
C. Maximum safe crosswind charts
D. Use of Denalt Computer
E. Landing charts
F. Stall speed charts
G. Airspeed measurement – TAS/IAS/CAS/EAS
H. Airspeed correction charts
I. Computing density/pressure/altitudes
J. Effect of density altitude on performance
K. Effect of weight/balance on performance
L. Critical performance speeds – "V Speeds"
M. Effect of wind on aircraft performance
N. Bank/speed versus rate/radius of turn
O. Stall speed versus altitude or attitude
P. Stall speed versus indicated/true airspeed
Q. Obstacle clearance takeoff/landing
R. Best angle-/rate-of-climb
S. Computation of gross weight/useful load
T Computation of center-of-gravity
U. Weight addition or removal
V. Balance, stability, and center-of-gravity
W. Effect of adverse balance
X. Shifting of loose cargo
Y. Management of weight and balance control
Z. Weight shifting

VIII. Flight Instruments and Systems.

A. Attitude indicator operation/errors
B. Heading indicator operation/errors
C. Turn indicator/coordinator
D. Altimeter operation/errors
E. Vertical speed indicator operation/errors

- F. Airspeed indicator operation/errors
- G. Vacuum systems/instruments
- H. Pitot-static systems/instruments
- I. Magnetic compass operation/errors
- J. Altimeter setting procedures/significance
- K. Pressure altitude–significance/obtaining
- L. Gyroscopic principles

IX. **Airplane Operation.**

- A. Normal/crosswind takeoffs/landings
- B. Maximum performance takeoffs/landings
- C. Emergency landings
- D. Maneuvering speed
- E. Taxiing in strong surface winds
- F. Flaps operation/systems
- G. Landing gear operation systems
- H. Controllable pitch propellers – operation/systems
- I. Supercharged engine operation

EXCERPTS OF REGULATIONS ON CERTIFICATION OF COMMERCIAL PILOTS

Subpart A—General

§ 61.33 Tests: general procedure.

Tests prescribed by or under this Part are given at times and places, and by persons, designated by the Administrator.

§ 61.35 Written test: prerequisites and passing grades.

(a) An applicant for a written test must—

(1) Show that he has satisfactorily completed the ground instruction or home study course required by this Part for the certificate or rating sought;

(2) Present as personal identification an airman certificate, driver's license, or other official document; and

(3) Present a birth certificate or other official document showing that he meets the age requirement prescribed in this Part for the certificate sought not later than 2 years from the date of application for the test.

(b) The minimum passing grade is specified by the Administrator on each written test sheet or booklet furnished to the applicant.

This section does not apply to the written test for an airline transport pilot certificate or a rating associated with that certificate.

§ 61.37 Written tests: cheating or other unauthorized conduct.

(a) Except as authorized by the Administrator, no person may—

(1) Copy, or intentionally remove, a written test under this Part;

(2) Give to another, or receive from another, any part of copy of that test;

(3) Give help on that test to, or receive help on that test from, any person during the period that test is being given;

(4) Take any part of that test in behalf of another person;

(5) Use any material or aid during the period that test is being given; or

(6) Intentionally cause, assist, or participate in any act prohibited by this paragraph.

(b) No person whom the Administrator finds to have committed an act prohibited by paragraph (a) of this section is eligible for any airman or ground instructor certificate or rating, or to take any test therefor, under this chapter for a period of one year after the date of that act. In addition, the commission of that act is a basis for suspending or revoking any airman or ground instructor certificate or rating held by that person.

§ 61.39 Prerequisites for flight tests.

(a) To be eligible for a flight test for a certificate, or an aircraft or instrument rating issued under this Part, the applicant must—

(1) Have passed any required written test since the beginning of the 24th month before the month in which he takes the flight test;

(2) Have the applicable instruction and aeronautical experience prescribed in this Part;

(3) Hold a current medical certificate appropriate to the certificate he seeks or, in the case of a rating to be added to his pilot certificate, at least a third-class medical certificate issued since the beginning of the 24th month before the month in which he takes the flight test;

(4) Except for a flight test for an airline transport pilot certificate, meet the age requirement for the issuance of the certificate or rating he seeks; and

(5) Have a written statement from an appropriately certificated flight instructor certifying that he has given the applicant flight instruction in preparation for the flight test within 60 days preceding the date of application, and finds him competent to pass the test and to have satisfactory knowledge of the subject areas in which he is shown to be deficient by his FAA airman written test report. However, an applicant need not have this written statement if he—

(i) Holds a foreign pilot license issued by a contracting State to the Convention on International Civil Aviation that authorizes at least the pilot privileges of the airman certificate sought by him;

(ii) Is applying for a type rating only, or a class rating with an associated type rating; or

(iii) Is applying for an airline transport pilot certificate or an additional aircraft rating on that certificate.

(b) Notwithstanding subparagraph (1) of paragraph (a) of this section, an applicant for an airline transport pilot certificate or an additional aircraft rating on that certificate who has been, since passing the written examination, continuously employed as a pilot, or as a pilot assigned to flight engineer duties by, and is participating in an approved pilot training program of a U.S. air carrier or commercial operator, or who is rated as a pilot by, and is participating in a pilot training program of a U.S. scheduled military air transportation service, may take the flight test for that certificate or rating.

§ 61.49 Retesting after failure.

An applicant for a written or flight test who fails that test may not apply for retesting until after 30 days after the date he failed the test. However, in the case of his first failure he may apply for retesting before the 30 days have expired upon presenting a written statement from an authorized instructor certifying that he has given flight or ground instruction as appropriate to the applicant and finds him competent to pass the test.

Subpart F—Commercial Pilots

§ 61.121 Applicability.

This subpart prescribes the requirements for the issuance of commercial pilot certificates and ratings, the conditions under which those certificates and ratings are necessary, and the limitations upon these certificates and ratings.

§ 61.123 Eligibility requirements: general

To be eligible for a commercial pilot certificate, a person must—

(a) Be at least 18 years of age;

(b) Be able to speak, read, and understand English, or have an operating limitation on his pilot certificate as is necessary for safety;

(c) Hold at least a valid second-class medical certificate issued under Part 67 of this chapter, or, in the case of a glider or free balloon rating, certify that he has no known medical deficien[illegible] that makes him unable to pilot a glider or a free balloon, as appropriate;

(d) Pass a written examination appropriate to the aircraft rating sought on the subjects in which ground instruction is required by § 61.125;

(e) Pass an oral and flight test appropriate to the rating he seeks, covering items selected by the inspector or examiner from those on which training is required by § 61.127; and

(f) Comply with the provisions of this subpart which apply to the rating he seeks.

§ 61.125 Aeronautical knowledge.

An applicant for a commercial pilot certificate must have logged ground instruction from an authorized instructor, or must present evidence showing that he has satisfactorily completed a course of instruction or home study, in at least the following areas of aeronautical knowledge appropriate to the category of aircraft for which a rating is sought.

(a) *Airplanes.*

(1) The regulations of this chapter governing the operations, privileges, and limitations of a commercial pilot, and the accident reporting requirements of the National Transportation Safety Board.

(2) Basic aerodynamics and the principles of flight which apply to airplanes; and

(3) Airplane operations, including the use of flaps, retractable landing gears, controllable propellers, high altitude operation with and without pressurization, loading and balance computations, and the significance and use of airplane performance speeds.

WRITTEN TEST SUBJECT MATTER CODES

DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
PRIVATE AND COMMERCIAL PILOT
Written Test Subject Matter Codes

41

USE ONLY TO IDENTIFY CODES, not as study outline since Private and Commercial areas are combined. To determine the subject areas you missed, compare subject matter codes on your AC Form 8080-2, Airman Written Test Report, with coded items on this list of subjects. The total number of questions you missed are NOT reflected by the number of subject matter codes shown on the test report, since ONE OR MORE questions may have been asked in each item shown.

FEDERAL AVIATION REGULATIONS

PART 1;71: DEFINITIONS/CONTROLLED AIRSPACE

A01 - Air commerce
A02 - Airport traffic area
A03 - Ceiling
A04 - Commercial operator
A05 - Flight level
A06 - Flight visibility
A07 - Interstate air commerce
A08 - Large aircraft
A09 - Major alteration
A10 - Major repair
A11 - Pilot in command
A12 - Second in command
A13 - Federal airway
A14 - Control area
A15 - Continental control area
A16 - Control zone
A17 - Route segment
A18 - Terminal control area
A19 - Positive control area

PART 61: CERTIFICATION: PILOTS/FLIGHT INSTRUCTORS

B01 - Required certificate/rating
B02 - Certificates and ratings issued
B03 - Expired pilot certificates/reissuance
B04 - Carriage of narcotic drugs/marihuana
B05 - Duration of pilot certificates
B06 - Duration of medical certificates
B07 - General limitations
B08 - Pilot logbooks
B09 - Operations during medical deficiency
B10 - Second in command qualifications
B11 - Recent experience: Pilot in command
B12 - Pilot in command proficiency check
B13 - Falsification, reproduction, alteration
B14 - Change of address
B15 - Glider towing: experience/instruction
B16 - Private privileges/limitations
B17 - Free balloon rating: limitations
B18 - Commercial pilot privileges/limitations
B19 - Airship/free balloon: limitations

PART 91: GENERAL OPERATING RULES-SUBPART A

C01 - Responsibility of pilot in command
C02 - Pilot in command - more than one pilot
C03 - Preflight action
C04 - Flight crewmembers at stations
C05 - Interference with crewmembers
C06 - Careless or reckless operation
C07 - Liquor and drugs
C08 - Flights between Mexico/United States
C09 - Dropping objects
C10 - Fastening of safety belts
C11 - Parachutes and parachuting
C12 - Towing: gliders or other than gliders
C13 - Portable electronic devices
C14 - Simulated instrument and flight tests
C15 - ATC transponder equipment requirements
C16 - VOR equipment check for IFR operations
C17 - Fuel requirements - IFR conditions
C18 - Civil aircraft: certificates required
C19 - Special authorizations - foreign aircraft
C20 - Aircraft airworthiness
C21 - Aircraft operating limitations/markings
C22 - Supplemental oxygen
C23 - Instrument and equipment requirements
C24 - Flight recorders; cockpit voice recorders
C25 - Automatic reported altitude/pilot's reference
C26 - Transport airplane weight limitation
C27 - Maximum weights for airplanes in Alaska
C28 - Limited/restricted aircraft limitations
C29 - Experimental aircraft limitations
C30 - Special rules for foreign civil aircraft
C31 - Ferry flight with one engine inoperative
C32 - Emergency exits for airplanes
C33 - Aural speed warning device
C34 - Altitude alerting system or device
C35 - Emergency locator transmitters
C36 - Report: aircraft identification/activity

PART 91: GENERAL FLIGHT RULES-SUBPART B

D01 - Waivers
D02 - Operating near other aircraft
D03 - Right-of-way rules; operations
D04 - Aircraft speed
D05 - Acrobatic flight
D06 - Aircraft lights
D07 - Complying - ATC clearances/instructions
D08 - ATC light signals
D09 - Minimum safe altitudes; general
D10 - Altimeter settings
D11 - Flight plan; information required
D12 - Operating - in vicinity of airport
D13 - Operation - airport with control tower
D14 - Operation - airport without tower
D15 - Flight in terminal control areas
D16 - Temporary flight restrictions
D17 - Flight test areas
D18 - Restricted and prohibited areas
D19 - Positive control areas; route segments
D20 - Jet advisory areas
D21 - Operations to, or over, Cuba
D22 - Flight limitation - space flight recovery
D23 - Operation: aircraft of Cuban registry
D24 - Flight restriction - Presidential/parties
D25 - Basic VFR weather minimums
D26 - Special VFR weather minimums
D27 - VFR cruising altitude or flight level
D28 - ATC clearance/flight plan required (IFR)
D29 - Takeoff/landing under IFR
D30 - Limitations-instrument approach procedure
D31 - Minimum altitudes for IFR operations
D32 - IFR cruising altitude/flight level
D33 - Course to be flown (IFR)
D34 - IFR radio communications
D35 - IFR two-way communications failure
D36 - Malfunction reports (IFR)
D37 - ATC transponder test/inspections

AC Form 8080-2-20 (5-75) (0052-00-558-7001) Supersedes AC Form 8060-37-20 (7-74)

PART 91: MAINTENANCE, PREVENTATIVE MAINTENANCE, AND ALTERATIONS-SUBPART C

E01 - General maintenance and alterations
E02 - Maintenance required
E03 - Carrying persons after repair/alteration
E04 - Inspections/progressive inspection
E05 - Altimeter system tests/inspections
E06 - Maintenance records/transfer of records
E07 - Rebuilt engine maintenance records
E08 - ATC transponder test/inspection

PART 91: LARGE AND TURBINE-POWERED MULTIENGINE AIRPLANES-SUBPART D

F01 - Applicability
F02 - Flying equipment/operating information
F03 - Familiarity with operating limitations and emergency equipment
F04 - Equipment - over-the-top/night VFR
F05 - Survival equipment/overwater operations
F06 - Radio equipment/overwater operations
F07 - Emergency equipment
F08 - Flight altitude rules
F09 - Smoking and safety belt signs
F10 - Passenger briefing
F11 - Carry-on baggage
F12 - Carriage of cargo
F13 - VFR fuel requirements
F14 - Operating in icing conditions
F15 - Flight engineer requirements
F16 - Second in command requirements
F17 - Flight attendant requirements
F18 - Inspection program

PART 135: AIR TAXI OPERATORS AND COMMERCIAL OPERATORS OF SMALL AIRCRAFT

G01 - Subpart A - General
G02 - Subpart B - Rules-ATCO certificate holder
G03 - Subpart C - Operating rules
G04 - Subpart D - Crewmember qualifications
G05 - Subpart E - Aircraft and equipment

NATIONAL TRANSPORTATION SAFETY BOARD

PART 430: NOTIFICATION AND REPORTING ACCIDENTS

H01 - Applicability
H02 - Definitions
H03 - Immediate notification and information
H04 - Preserving wreckage/mail/cargo/records
H05 - Reports/statements to be filed

FAA ADVISORY CIRCULARS

I01 - Series 00 General
I02 - Series 20 Aircraft
I03 - Series 60 Airmen
I04 - Series 70 Airspace
I05 - Series 90 Air Traffic Control and General Operations
I06 - Series 120 Air Carrier and Commercial Operators and Helicopters
I07 - Series 150 Airports
I08 - Series 170 Air Navigation Facilities

FLIGHT INFORMATION PUBLICATIONS

J01 - Glossary of aeronautical terms
J02 - Airport lighting/marking/aids
J03 - Air navigation radio aids
J04 - Visual approach slope indicator
J05 - Controlled/uncontrolled airspace
J06 - Operating at non-tower airports
J07 - Special use airspace-prohibited, restricted, ISJTA, alert areas
J08 - Automatic terminal information service
J09 - ATC departure/enroute/arrival procedures
J10 - Radar traffic information service
J11 - Stage I, II, III terminal radar service
J12 - Aeronautical advisory stations (UNICOM)
J13 - Radiotelephone phraseology/technique
J14 - Traffic/wind direction indicators
J15 - Obtaining weather information/briefing
J16 - Flight plans
J17 - VHF/UHF direction finder
J18 - ADIZ and designated mountainous areas
J19 - Medical facts for pilots
J20 - Good operating practices
J21 - Obtaining airport/heliport data
J22 - FSS/Weather Service telephone numbers
J23 - Obtaining radio facility/FSS data
J24 - Special notices/Special Operations
J25 - Notices to airmen (NOTAMS)
J26 - Terminal radar service areas
J27 - Terminal area graphic notices
J28 - Restrictions to enroute navigation aids
J29 - VOR receiver check points
J30 - Parachute jumping areas

AERODYNAMICS AND PRINCIPLES OF FLIGHT

O01 - Laws of motion
O02 - Functions of the flight controls
O03 - Principles of airfoils
O04 - Forces acting on the aircraft
O05 - Flight controls/axes of the aircraft
O06 - Lift/drag during turns
O07 - Lift versus angle of attack
O08 - Lift/thrust versus air density
O09 - Effect of ice/snow/frost on airfoils
O10 - Power versus climb/descent/level flight
O11 - Gyroscopic precession
O12 - Coning (helicopter)
O13 - Translating tendency (helicopter)
O14 - Ground effect
O15 - Translational lift (helicopter)
O16 - Transverse flow effect (helicopter)
O17 - Loads/load factors
O18 - Stability/controllability
O19 - Stall/spins
O20 - Effects of flaps, spoilers, dive brakes
O21 - Relative wind/angle of attack
O22 - Effect of wind during turns
O23 - Torque effects - P factor
O24 - Dissymmetry of lift (helicopter)

AIRCRAFT AND ENGINE OPERATION - GENERAL

P01 - Fuel injection/carburetor principles
P02 - Reciprocating engine principles
P03 - Preflight/postflight safety practices
P04 - Use of mixture/throttle/propeller control
P05 - Use of proper fuel grade/type
P06 - Fuel system operation
P07 - Engine starting/shutdown
P08 - Detonation cause/effect
P09 - Fuel contamination-prevention/elimination
P10 - Emergency-engine/systems/equipment/fire
P11 - Carburetor ice-cause/detection/elimination
P12 - Wake turbulence-causes/precautions
P13 - Crosswind takeoff/landing
P14 - Proper loading of the aircraft
P15 - Interpreting engine instruments
P16 - Ignition or electrical system/units
P17 - Recovery from critical flight situations
P18 - Carburetor heat effect on mixture
P19 - Aircraft operating limitations
P20 - Manifold pressure versus RPM
P21 - High altitude operations/pressurization
P22 - Use of oxygen and oxygen equipment
P23 - Mid-air collision avoidance precautions

AIRCRAFT/ENGINE PERFORMANCE - GENERAL

Q01 - Takeoff charts (airplane/rotorcraft)
Q02 - Rate-of-climb charts (airplane/rotorcraft)
Q03 - Cruise charts (airplane/rotorcraft)
Q04 - Maximum safe crosswind charts (airplane)
Q05 - Use of Denalt computer (airplane)
Q06 - Landing charts (airplane/rotorcraft)
Q07 - Altitude-airspeed charts (rotorcraft)
Q08 - Stall speed charts (airplane)
Q09 - Hovering ceiling charts (rotorcraft)
Q10 - Airspeed correction charts (airplane)
Q11 - Predicting performance (helicopter)
Q12 - Computing density/pressure altitudes
Q13 - Effect of density altitude on performance
Q14 - Effect of weight/balance on performance
Q15 - Critical performance speeds - "V speeds"
Q16 - Effect of wind on aircraft performance
Q17 - Bank/speed versus rate/radius of turn
Q18 - Stall speed versus altitude or attitude
Q19 - Stall speed versus indicated/true airspeed
Q20 - Obstacle clearance takeoff/landing
Q21 - Best angle/best rate-of-climb (airplane)
Q22 - Computation of gross weight/useful load
Q23 - Computation of center gravity
Q24 - Minimum sink speed (glider)
Q25 - Glide ratio - L/D (glider)
Q26 - Speed-to-fly (glider)
Q27 - Best-glide-speed (glider)
Q28 - Glider performance curves (glider)
Q29 - Airspeed for searching for lift (glider)

FLIGHT INSTRUMENTS AND SYSTEMS

R01 - Attitude indicator operation/errors
R02 - Heading indicator operation/errors
R03 - Turn indicator/coordinator
R04 - Altimeter operation/errors
R05 - Vertical speed indicator operation/errors
R06 - Airspeed indicator operation/errors
R07 - Vacuum systems/instruments
R08 - Pitot-static systems/instruments
R09 - Magnetic compass operation/errors
R10 - Altimeter setting procedure/significance
R11 - Pressure altitude-significance/obtaining
R12 - Gyroscopic principles

AIRPLANE OPERATION

U01 - Normal/crosswind takeoff/landing
U02 - Maximum performance takeoff/landing
U03 - Emergency landings
U04 - Maneuvering speed
U05 - Taxiing with strong surface wind
U06 - Flaps operation
U07 - Retractable landing gear operation
U08 - Controllable pitch propeller operation
U09 - Supercharged engine operation
U10 - Multiengine critical engine failure

AIRMAN WRITTEN TEST APPLICATION

PRIVACY ACT STATEMENT

The information on this form is required under the authority of the Federal Aviation Act (Section 602). Certification cannot be completed unless the data is complete.

Disclosure of your Social Security Account Number (SSAN) is optional. If you do not supply your SSAN, a substitute number or identifier will be assigned to give your record a unique 9-digit number for internal control of airman records.

If your SSAN has been previously given, it is already in the system. Requests for removal must be in writing. If you do not wish your SSAN on future records, please do not disclose SSAN on airman written test, airman certification, and/or medical certification applications.

Routine uses of records maintained in the system, including categories of users and the purposes of such uses: To determine that airmen are certified in accordance with the provision of the Federal Aviation Act of 1958. Repository of documents used by individual and potential employers to determine validity of airmen qualifications. To support investigative efforts of investigation and law enforcement agencies of Federal, State, and local Governments. Supportative information in court case concerning individual status and/or qualifications in law suits. To provide data for the Comprehensive Airman Information System (CAIS). To provide documents for microfilm and microfiche backup records.

INSTRUCTIONS TO APPLICANT:

- ATTENTION: READ THE FOLLOWING PARAGRAPH CAREFULLY BEFORE COMPLETING THIS APPLICATION:

  WHOEVER, IN ANY MATTER WITHIN THE JURISDICTION OF ANY DEPARTMENT OR AGENCY OF THE UNITED STATES KNOWINGLY AND WILLFULLY FALSIFIES, CONCEALS OR COVERS UP BY ANY TRICK, SCHEME, OR DEVICE A MATERIAL FACT, OR MAKES ANY FALSE, FICTITIOUS OR FRAUDULENT STATEMENTS OR REPRESENTATIONS, OR MAKES OR USES ANY FALSE WRITING OR DOCUMENT KNOWING THE SAME TO CONTAIN ANY FALSE, FICTITIOUS OR FRAUDULENT STATEMENT OR ENTRY, SHALL BE FINED NOT MORE THAN $10,000 OR IMPRISONED NOT MORE THAN 5 YEARS, OR BOTH (U.S. CODE, TITLE 18, SEC. 1001.)

  Sample

- CERTAIN TEST QUESTIONS INVOLVING REGULATIONS, ATC PROCEDURES, ETC., ARE FREQUENTLY OUTDATED BY VERY RECENT CHANGES. IN THESE INSTANCES, APPLICANTS ARE GIVEN CREDIT FOR THE QUESTION DURING THE PERIOD THAT IT TAKES TO DISTRIBUTE A REVISED QUESTION.

- DO NOT TEAR SHEETS APART.

- TURN TO PAGE 4 AND COMPLETE THE PERSONAL DATA SECTION. BE SURE THAT YOUR SIGNATURE IS ON THE PROPER LINE. BEFORE COMMENCING TEST, READ INSTRUCTIONS FOR MARKING THE ANSWER SHEET.

INSTRUCTIONS TO FAA PERSONNEL:

- REFER TO PAGE 3 OF THE APPLICATION FOR COMPLETION OF THE TIME WAIVER AND SECTION WAIVER BLOCK WHEN REQUIRED.

DEPARTMENT OF TRANSPORTATION — FEDERAL AVIATION ADMINISTRATION

AIRMAN WRITTEN TEST APPLICATION

DATE OF TEST: MONTH 02 DAY 2 YEAR 77

TITLE OF TEST: COMMERCIAL PILOT – AIRPLANE

TEST NO. [illegible]

PLEASE PRINT ONE LETTER IN EACH SPACE—LEAVE A BLANK SPACE AFTER EACH NAME

NAME (LAST, FIRST, MIDDLE): DOE JOHN RALPH

DATE OF BIRTH: MONTH DAY YEAR [illegible]

MAILING ADDRESS NO. AND STREET, APT. #, P.O. BOX, OR RURAL ROUTE: 1530 SOUTH 12TH STREET

CITY, TOWN OR POST OFFICE AND STATE: ANYTOWN AMERICA

ZIP CODE: [illegible]

DESCRIPTION: HEIGHT [illegible] WEIGHT [illegible] HAIR [illegible] EYES [illegible]

BIRTHPLACE (City and State, or foreign country): Miami, Florida

CITIZENSHIP: U.S.

SOCIAL SECURITY NO.

IF A SOCIAL SECURITY NUMBER HAS NEVER BEEN ISSUED CHECK THIS BLOCK → ☐

Is this a retest? ☒ No ☐ Yes, date of last test

Have you taken or are you taking an FAA approved course for this test? ☐ No ☐ Yes (If 'yes' give details below)

Graduation date | NAME OF SCHOOL | CITY AND STATE

CERTIFICATION: I CERTIFY that all of the statements made in this application are true, complete, and correct to the best of my knowledge and belief and are made in good faith. Signature

— — DO NOT WRITE IN THIS BLOCK — — FOR USE OF FAA OFFICE ONLY — —

CARD A					CARD B			
CATEGORY	TEST NUMBER	TAKE NO	SECTIONS 1 2 3 4 5 6 7	EXPIRATION MONTH DAY YEAR	CERTIFICATED SCHOOL NUMBER	MECH EXP DATE BY SECTION 1 2 3	ID	

Applicant's identity established by

FIELD OFFICE DESIGNATION

SIGNATURE of FAA Representative

INSTRUCTIONS FOR MARKING THE ANSWER SHEET. Completely darken only one circle for each question. DO NOT USE (X) OR (✓). Use black lead pencil furnished by examiner. To make corrections, open answer sheet so erasure marks will not show on page 2. Then erase incorrect response on page 4. On page 2 (copy) mark the incorrect response with a slash (/). Questions are arranged in VERTICAL sequence as indicated by the arrows.

1 ①②③④	23 ①②③④	45 ①②③④	67 ①②③④	89 ①②③④	111 ①②③④	133 ①②③④
2 ①②③④	24 ①②③④	46 ①②③④	68 ①②③④	90 ①②③④	112 ①②③④	134 ①②③④
3 ①②③④	25 ①②③④	47 ①②③④	69 ①②③④	91 ①②③④	113 ①②③④	135 ①②③④
4 ①②③④	26 ①②③④	48 ①②③④	70 ①②③④	92 ①②③④	114 ①②③④	136 ①②③④
5 ①②③④	27 ①②③④	49 ①②③④	71 ①②③④	93 ①②③④	115 ①②③④	137 ①②③④
6 ①②③④	28 ①②③④	50 ①②③④	72 ①②③④	94 ①②③④	116 ①②③④	138 ①②③④
7 ①②③④	29 ①②③④	51 ①②③④	73 ①②③④	95 ①②③④	117 ①②③④	139 ①②③④
8 ①②③④	30 ①②③④	52 ①②③④	74 ①②③④	96 ①②③④	118 ①②③④	140 ①②③④
9 ①②③④	31 ①②③④	53 ①②③④	75 ①②③④	97 ①②③④	119 ①②③④	141 ①②③④
10 ①②③④	32 ①②③④	54 ①②③④	76 ①②③④	98 ①②③④	120 ①②③④	142 ①②③④
11 ①②③④	33 ①②③④	55 ①②③④	77 ①②③④	99 ①②③④	121 ①②③④	143 ①②③④
12 ①②③④	34 ①②③④	56 ①②③④	78 ①②③④	100 ①②③④	122 ①②③④	144 ①②③④
13 ①②③④	35 ①②③④	57 ①②③④	79 ①②③④	101 ①②③④	123 ①②③④	145 ①②③④
14 ①②③④	36 ①②③④	58 ①②③④	80 ①②③④	102 ①②③④	124 ①②③④	146 ①②③④
15 ①②③④	37 ①②③④	59 ①②③④	81 ①②③④	103 ①②③④	125 ①②③④	147 ①②③④
16 ①②③④	38 ①②③④	60 ①②③④	82 ①②③④	104 ①②③④	126 ①②③④	148 ①②③④
17 ①②③④	39 ①②③④	61 ①②③④	83 ①②③④	105 ①②③④	127 ①②③④	149 ①②③④
18 ①②③④	40 ①②③④	62 ①②③④	84 ①②③④	106 ①②③④	128 ①②③④	150 ①②③④
19 ①②③④	41 ①②③④	63 ①②③④	85 ①②③④	107 ①②③④	129 ①②③④	
20 ①②③④	42 ①②③④	64 ①②③④	86 ①②③④	108 ①②③④	130 ①②③④	
21 ①②③④	43 ①②③④	65 ①②③④	87 ①②③④	109 ①②③④	131 ①②③④	
22 ①②③④	44 ①②③④	66 ①②③④	88 ①②③④	110 ①②③④	132 ①②③④	

Sample

AC FORM 8080 (8/72) 7680057 00 37 2006)

DEPARTMENT OF TRANSPORTATION-FEDERAL AVIATION ADMINISTRATION

QUESTION SELECTION SHEET

TITLE	SELECTION NO.
COMMERCIAL PILOT — AIRPLANE	254601

NAME John R Doe

NOTE: MARKING ON THIS SHEET IS PERMITTED.

On Answer Sheet For Item No.	Answer Question Number	On Answer Sheet For Item No.	Answer Question Number	On Answer Sheet For Item No.	Answer Question Number
1 . . .	204	21 . . .	404	41 . . .	500
2 . . .	212	22 . . .	413	42 . . .	617
3 . . .	225	23 . . .	423	43 . . .	620
4 . . .	232	24 . . .	434	44 . . .	639
5 . . .	242	25 . . .	447	45 . . .	647
6 . . .	252	26 . . .	454	46 . . .	657
7 . . .	268	27 . . .	468	47 . . .	665
8 . . .	271	28 . . .	478	48 . . .	675
9 . . .	282	29 . . .	483	49 . . .	683
10 . . .	292	30 . . .	493	50 . . .	696
11 . . .	304	31 . . .	503	51 . . .	703
12 . . .	314	32 . . .	513	52 . . .	712
13 . . .	322	33 . . .	523	53 . . .	724
14 . . .	332	34 . . .	533	54 . . .	734
15 . . .	344	35 . . .	544	55 . . .	742
16 . . .	354	36 . . .	553	56 . . .	754
17 . . .	362	37 . . .	563	57 . . .	764
18 . . .	374	38 . . .	566	58 . . .	771
19 . . .	382	39 . . .	572	59 . . .	781
20 . . .	392	40 . . .	590	60 . . .	796

Sample

For Official Use Only

COMMERCIAL PILOT TEST QUESTIONS

001. In which of the following flight operations is the pilot in command required to possess an instrument rating while operating in VFR conditions?

B-01
1- Flight in the Continental Control Area.
2- On an international flight.
3- In the Positive Control Area.
4- On a DVFR flight plan.

002. Unless otherwise authorized, a pilot in command is required to possess a "Type Rating" for that aircraft when operating

B-01
1- any aircraft that requires more than one pilot.
2- an airplane with a gross weight in excess of 12,500 pounds.
3- a multiengine airplane with a gross weight in excess of 6,000 pounds.
4- an airplane with a gross weight in excess of 6,000 pounds.

003. Unless otherwise authorized, a pilot in command is required to possess a "Type Rating" for that aircraft when operating

B-01
1- a lighter-than-air category aircraft.
2- an airplane in air commerce between the United States and other countries.
3- a turbojet powered airplane.
4- any military surplus aircraft.

004. Which statement is true concerning the requirements for flight within a Group I Terminal Control Area?

A-18
1- Distance measuring equipment is required.
2- At least a Commercial Pilot Certificate is required.
3- A radar beacon transponder is required.
4- Automatic direction finding equipment is required.

005. Which of the following is required equipment for operating an airplane within a Group II TCA?

A-18
1- An Automatic Direction Finder.
2- A 4096 code transponder.
3- A VOR receiver with DME.
4- A 4096 code transponder with Mode C (automatic altitude reporting).

006. Regardless of weather conditions, ATC authorization is required prior to operating an aircraft within a

A-18
1- Transition Area.
2- Terminal Control Area (TCA).
3- Terminal Radar Service Area (TRSA).
4- Control Zone.

007. At least a Private Pilot Certificate is required to

A-18
1- operate an airplane within a transition area at night.
2- enter a control zone under a Special VFR Clearance.
3- land or take off from an airport within a Group I TCA.
4- enter an Airport Traffic Area.

008. A request for a deviation from the 4096 code transponder equipment requirement, when operating in a Group I TCA, must be submitted to the

A-18
1- nearest FAA General Aviation District Office 24 hours before the proposed operation.
2- FAA Administrator at least 24 hours before the proposed operation.
3- appropriate control tower at least 48 hours before the proposed operation.
4- controlling ATC facility at least 4 hours before the proposed operation.

009. Which statement concerning Terminal Control Areas (TCAs) is true?

A-18
1- No person may operate an aircraft in either a Group I or a Group II TCA unless prior authorization from ATC has been received.
2- Flight under Visual Flight Rules is not permitted in Group I TCAs.
3- TCAs start at ground level and extend upward to, but not including, the base of Positive Control Areas.
4- Flight plans are required for flight operations in Group II TCAs.

010. Regulations which refer to "commercial operator" relate to that person who

A-04
1- engages in air commerce, other than air carrier, for compensation or hire.
2- acts as pilot in command of an air carrier aircraft.
3- is the owner of a scheduled airline.
4- is a required crewmember aboard an airline transport aircraft.

011. Regulations which refer to the "operational control" of a flight are in relation to

A-04
1- exercising the privileges of pilot in command of an aircraft.
2- exercising authority over initiating, conducting, or terminating a flight.
3- the specific duties of any required crewmember.
4- acting as the sole manipulator of the aircraft controls.

012. Regulations which refer to "operator" relate to that person who

A-04
1- causes the aircraft to be used or authorizes its use.
2- is the sole manipulator of the aircraft controls.
3- is a required crewmember aboard the aircraft.
4- acts as pilot in command of the aircraft.

013. Rules governing Airport Traffic Areas apply when flying into all

A-02
1- airports with an operating Flight Service Station.
2- airports with an operating control tower.
3- control zones.
4- airports.

014. An Airport Traffic Area extends upward to, but does not include,

A-02
1- 3,000 feet AGL.
2- 3,000 feet MSL.
3- 2,000 feet AGL.
4- 2,000 feet MSL.

015. Airport Traffic Areas are in effect at all airports where

A-02
1- a control zone is in effect.
2- a Flight Service Station is in operation.
3- a control tower is in operation.
4- the airport is located within the lateral limits of controlled airspace.

016. To serve as second in command of "large" airplanes a person must hold at least a

B-10
1- Private Pilot Certificate with the appropriate category and class ratings.
2- Commercial Pilot Certificate with the appropriate category, class, and type ratings.
3- Private Pilot Certificate with the appropriate category, class, and type ratings.
4- Commercial Pilot Certificate with the appropriate category and class ratings.

017. What flight time may a pilot log as second in command?

B-08 1- One-half of the total flight time while serving as second in command on aircraft requiring more than one pilot.

2- Only that flight time during which the second in command is the sole manipulator of the controls.

3- All flight time while acting as second in command in aircraft requiring more than one pilot.

4- All flight time while acting as second in command, regardless of aircraft crew requirement.

018. What flight time must be shown, in a reliable record, by a pilot exercising the privileges of a Commercial Certificate?

B-08 1- Only the additional flight instruction time received.

2- Only the flight time necessary to meet the recent experience requirements.

3- All flight time flown with passengers aboard the aircraft.

4- All additional flight time.

019. Which of the following is permitted if a pilot has a Commercial Certificate, airplane, with only a multiengine land class, and DC-3 type rating?

B-07 1- Operating any large airplane for hire.

2- Operating any multiengine airplane, regardless of weight.

3- Carrying passengers not for hire in a single-engine airplane.

4- Carrying passengers for hire in a light twin-engine land airplane.

020. If a Second-Class Medical Certificate was issued July 24, 1979, this certificate

B-06 1- permits private pilot privileges only beyond midnight July 24, 1980.

2- permits private pilot privileges only, beyond midnight of the last day of July 1980.

3- permits commercial pilot privileges only until midnight July 23, 1980.

4- must be renewed by midnight July 23, 1980, to carry passengers for hire after July 24, 1980.

021. If a pilot has only a "multiengine land" rating on a Commercial Certificate and carries passengers in a single-engine airplane, this pilot would be operating in

B-07 1- accordance with FARs, provided the pilot receives a checkout flight in the aircraft with a certificated instructor.

2- violation of FARs.

3- accordance with FARs, since the pilot is rated in a more complex aircraft and is not carrying passengers for hire.

4- violation of FARs, unless the pilot has made at least three takeoffs and three landings within the past 90 days.

022. Assume that a Second-Class Medical Certificate was issued on December 5, 1978. For operations not exercising the privileges of a Commercial Pilot Certificate, this medical certificate will be valid through the end of

B-06 1- December 31, 1979.
2- December 31, 1980.
3- December 5, 1979.
4- December 5, 1980.

023. If a Second-Class Medical Certificate was issued to a commercial pilot 13 months ago, during the next 11 months, this pilot may

B-06 1- act as pilot in command for compensation or hire, but may not carry passengers or property for compensation or hire.

2- not act as pilot in command nor carry passengers or property.

3- act as pilot in command for compensation or hire and carry passengers or property for compensation or hire.

4- act as pilot in command and carry passengers or property, but not for compensation or hire.

024. What is the earliest date a Second-Class Medical Certificate could have been issued to exercise the privileges of a Commercial Pilot Certificate on August 10, 1979?

B-06 1- August 1, 1978.
2- August 10, 1978.
3- July 31, 1978.
4- August 31, 1978.

025. What is the earliest date a Second-Class Medical Certificate could have been issued to exercise the privileges of a Commercial Pilot Certificate on June 12, 1979?

B-06
1- June 1, 1978.
2- June 12, 1978.
3- May 31, 1978.
4- July 31, 1978.

026. According to FARs, a Second-Class Medical Certificate issued January 18, 1979,

B-06
1- will expire, for commercial pilot privileges, January 31, 1981.
2- will expire January 31, 1980, for commercial pilot privileges, but may be used for private pilot privileges until January 31, 1981.
3- will expire January 18, 1980.
4- will expire January 31, 1981, for commercial pilot privileges, but may be used for private pilot privileges until January 31, 1982.

027. Which statement is true regarding Commercial Pilot Certificates?

B-05
1- They expire after a duration of 12 months.
2- They expire after a duration of 24 months.
3- They expire if recency of experience requirements are not met.
4- There is no expiration date on these certificates.

028. Examples of the term "category" as used with respect to certification, privileges, and limitations of airmen, include

B-02
1- airplane; rotorcraft; glider; and lighter-than-air.
2- DC-8 and DC-9; Lear Jet; and Jet Commander 1121.
3- transport, normal; utility; acrobatic; restricted.
4- single-engine; multiengine; land; water; helicopter.

029. You, as a commercial pilot carrying passengers for hire at night, are required to hold at least

B-01
1- a Commercial Pilot Certificate with a gold seal.
2- an instrument rating.
3- a First-Class Medical Certificate.
4- a type rating for the airplane to be flown.

030. An appropriate and current pilot and medical certificate must be in one's personal possession

B-01
1- at all times while acting in any capacity as a required crewmember.
2- only when acting as pilot in command for compensation or hire.
3- only when carrying passengers while acting as pilot in command.
4- only when acting as pilot in command during flight operations involving interstate commerce.

031. To carry passengers for hire on a VFR trip at night in a single-engine airplane, and to remain within a radius of 25 NM from the departure airport, you, the pilot in command would be required to possess at least a

B-01
1- Private Pilot Certificate with airplane single-engine land rating.
2- Commercial Pilot Certificate with airplane single-engine land and instrument ratings.
3- Private Pilot Certificate with airplane single-engine land and instrument ratings.
4- Commercial Pilot Certificate with airplane single-engine land rating.

032. To act as pilot in command of an aircraft, one must have satisfactorily (1) accomplished a flight review or (2) completed a pilot proficiency check within the preceding

B-12
1- 6 months.
2- 12 months.
3- 24 months.
4- 36 months.

033. Unless the necessary takeoffs and landings have been made to meet the recency of experience requirement, a commercial pilot may not

B-11
1- perform any duties as a crewmember.
2- fly for compensation or hire.
3- act as pilot in command.
4- carry passengers.

034. If recency of experience requirements for night flight are not met, and official sunset is 1806, the latest time which passengers can be carried is

B-11
1- 1806.
2- 1906.
3- 1706.
4- 1836.

035. To meet the recent flight experience requirements for acting as pilot in command carrying passengers at night, a pilot must have made, within the preceding 90 days and at night, at least

B-11
1- three takeoffs and three landings to a full stop in the same category and class of aircraft to be used.
2- three touch-and-go landings in the same category and class of aircraft to be used.
3- three takeoffs and three landings, either full stop or touch-and-go, but must be accompanied by a certificated flight instructor who meets the recent experience for night flight.
4- three takeoffs and three landings to a full stop in the same category but not necessarily in the same class of aircraft to be used.

036. What recent flight experience must be met before a commercial airplane pilot may fly solo in an airplane?

B-11
1- Three takeoffs and three landings within the preceding 90 days in an airplane.
2- Three takeoffs and three landings within the preceding 90 days in any fixed-wing aircraft.
3- Satisfactorily accomplished a flight review in any aircraft for which rated, within the preceding 24 months.
4- Satisfactorily accomplished a flight review within the preceding 24 months, but this review must be in an airplane.

037. If a pilot receives a biennial flight review on July 17, 1979, and a Commercial Glider Certificate on September 19, 1979, the next biennial flight review for this pilot would be due

B-11
1- July 17, 1981.
2- July 31, 1981.
3- September 30, 1981.
4- September 19, 1981.

038. If a pilot receives a biennial flight review March 14, 1979, and an instrument rating August 7, 1979, the next biennial flight review for this pilot would be due

B-11
1- March 14, 1981.
2- March 31, 1981.
3- August 7, 1981.
4- August 31, 1981.

039. Prior to carrying passengers at night, the pilot in command must have accomplished the required takeoffs and landings in

B-11
1- an aircraft that is equipped for instrument flight.
2- the same category and class of aircraft to be used.
3- the same category, class and type of aircraft to be used.
4- any category aircraft.

040. If the operational category of an airplane is listed as "normal," it would mean that this airplane could be operated in which of the following maneuvers?

C-21
1- All types of acrobatics.
2- Any maneuver requiring an abrupt change in attitude.
3- Limited acrobatics, including spins.
4- Any maneuver except acrobatics or spins.

041. Airworthiness Directives for general aviation aircraft are published as

C-20
1- supplements to the Advisory Circular System.
2- Notices to Airmen.
3- amendments to FARs.
4- nonregulatory directives.

042. Which statement is true relating to Airworthiness Directives (ADs)?

C-20 1- ADs are nonregulatory in nature.
2- Noncompliance with ADs renders an airplane unairworthy.
3- Compliance with ADs is the responsibility of maintenance personnel.
4- When ADs are complied with, airplane maintenance records may be discontinued.

043. Which document should show compliance with an applicable Airworthiness Directive?

C-20 1- The aircraft maintenance records.
2- The aircraft Airworthiness Certificate.
3- A log maintained separately from other aircraft records.
4- The aircraft Registration Certificate.

044. Airworthiness Directives for general aviation aircraft must be complied with in the same manner as

C-20 1- Advisory Circulars.
2- Federal Aviation Regulations.
3- nonregulatory directives.
4- Notices to Airmen.

045. Regarding certificates and documents, no person may operate an aircraft unless it has within it an

C-18 1- Airworthiness Certificate, aircraft and engine logbooks, and Owner's Handbook.
2- Airworthiness Certificate and Owner's Handbook.
3- Airworthiness Certificate, Registration Certificate, and operating limitations.
4- Airworthiness Certificate, and aircraft and engine logbooks.

046. No person may operate a civil aircraft unless the Airworthiness Certificate or special flight permit or authorization required by regulations, is

C-18 1- displayed at the cabin or cockpit entrance so that it is legible to passengers or crewmembers.
2- included in the approved logbooks for that aircraft.
3- filed with the other required certificates or documents within the aircraft.
4- filed in the operator's office from which the airplane is dispatched.

047. What documents or records must be aboard an aircraft during flight?

C-18 1- Operating limitations, and an aircraft Use and Inspection Report.
2- Operation limitations; a Registration Certificate; and an appropriate, current, and properly displayed Airworthiness Certificate.
3- Repair and alteration forms, and a Registration Certificate.
4- Aircraft and engine logbooks, and a Registration Certificate.

048. Portable electronic devices which may cause interference with the navigation or communication system may not be operated on aircraft being flown

C-13 1- in commercial operations.
2- at altitudes above 14,500 feet MSL.
3- within the United States.
4- along federal airways.

049. When must a required flight crewmember's seatbelt be fastened?

C-10 1- During takeoffs and landings only if passengers are being carried for hire.
2- During the entire flight while at the assigned station.
3- During the entire flight if the aircraft is being used for hire.
4- During takeoffs and landings only.

050. Prior to takeoff, passengers should be notified to fasten their seatbelts. This is

C-10 1- a good operating practice, although not mandatory.

2- mandatory prior to all takeoffs and landings.

3- mandatory prior to takeoffs but not landings.

4- mandatory for air taxi operators and airlines only.

051. A person may not act as a crewmember of an aircraft if alcoholic beverages have been consumed by that person within the preceding

C-07 1- 48 hours.
2- 24 hours.
3- 12 hours.
4- 8 hours.

052. One may not act as pilot in command of an aircraft while carrying passengers who are obviously under the influence of intoxicating liquors or drugs unless

C-07 1- it is decided the safety of the flight would not be affected.

2- liquors or drugs are not to be served aboard the aircraft.

3- these passengers are medical patients under proper care.

4- these passengers remain seated with the seatbelts fastened.

053. In addition to other preflight action, the regulations require the pilot in command to

C-03 1- determine runway lengths at airports of intended use.

2- check each fuel tank visually to ensure that it is always full.

3- check the accuracy of the omninavigation equipment.

4- file a flight plan.

054. Which statement is true regarding civil aircraft airworthiness?

C-01 1- The commercial operator is responsible for determining that the aircraft is in condition for safe flight.

2- An FAA certificated mechanic is responsible for determining that the aircraft is in condition for safe flight.

3- The pilot in command is responsible for determining that the aircraft is in condition for safe flight.

4- If an unairworthy mechanical or structural condition exists, that aircraft can be flown only in solo flight.

055. Determining that an aircraft is in condition for safe flight is the sole responsibility of the

C-01 1- pilot in command of that aircraft.

2- mechanic who services that aircraft.

3- operator who leases that aircraft.

4- owner of that aircraft.

056. If an in-flight emergency requires immediate action, a pilot in command may

C-01 1- not deviate from FARs unless permission is obtained from Air Traffic Control.

2- deviate from FARs to the extent required to meet that emergency.

3- not deviate from FARs unless prior to the deviation approval is granted by the Administrator.

4- deviate from FARs to the extent required to meet the emergency, but must submit a written report to the Administrator within 24 hours.

057. Pilots who change their permanent mailing address and fail to notify the Airmen Certification Branch of the FAA of this change are entitled to exercise the privileges of their pilot certificate for a period of

B-14 1- 180 days.
2- 90 days.
3- 60 days.
4- 30 days.

058. Supplemental oxygen must be used by the required minimum flight crew for that time exceeding 30 minutes while at cabin pressure altitudes above

C-22 1- 10,500 feet MSL.
2- 12,500 feet MSL.
3- 12,000 feet MSL.
4- 10,000 feet MSL.

059. Unless each occupant is provided with supplemental oxygen, no person may operate an aircraft above a cabin pressure altitude of

C-22 1- 14,000 feet MSL.
2- 10,000 feet MSL.
3- 15,000 feet MSL.
4- 12,000 feet MSL.

060. If an unpressurized airplane is operated at 13,500 feet MSL for 2 hours 45 minutes, how long during that time is the minimum flight crew required to use supplemental oxygen?

C-22 1- 2 hours 45 minutes.
2- 2 hours 15 minutes.
3- 2 hours.
4- 1 hour 45 minutes.

061. If an unpressurized airplane is operated at 14,500 feet MSL for 2 hours, how long during that time is the minimum flight crew required to use supplemental oxygen?

C-22 1- 2 hours.
2- 1 hour 30 minutes.
3- 1 hour.
4- 30 minutes.

062. If a pressurized airplane is not equipped with quick-donning type oxygen masks, one pilot at the controls must wear an oxygen mask when operating above which Flight Level?

C-22 1- 250.
2- 300.
3- 180.
4- 350.

063. When Operating a pressurized aircraft above Flight Level 350, and it becomes necessary for one of the required pilots to leave the station, the remaining pilot at the controls shall

C-22 1- reduce the cabin pressure altitude to 14,000 feet MSL and maintain this cabin pressure altitude until the other pilot returns.

2- assure that a quick-donning oxygen mask is available that can be sealed on the face within 5 seconds.

3- require all remaining crewmembers to use oxygen masks until the other pilot returns.

4- use the oxygen mask until the other pilot returns to the station.

064. At which of these cabin pressure altitudes may a pilot operate an aircraft in excess of 30 minutes without supplemental oxygen?

C-22 1- 12,500 feet MSL.
2- 14,500 feet MSL.
3- 15,000 feet MSL.
4- 15,500 feet MSL.

065. At least a 10-minute supply of supplemental oxygen must be available for each occupant of a pressurized aircraft when operating above which Flight Level?

C-22 1- 200.
2- 190.
3- 250.
4- 180.

066. Above which cabin pressure altitude must the required minimum flight crew use supplemental oxygen at all times?

C-22 1- 10,000 feet MSL.
2- 14,000 feet MSL.
3- 12,500 feet MSL.
4- 12,000 feet MSL.

067. If the operational category of an airplane is listed as "utility," it would mean that this airplane could be operated in which of the following maneuvers?

C-21 1- Limited acrobatics, including spins.

2- Any maneuver that requires an abrupt change in attitude.

3- All types of acrobatics.

4- Any maneuver except acrobatics or spins.

068. Assume a pilot flying a single-engine airplane observes a multiengine airplane approaching on a collision course from the left. Which pilot should give way and why?

D-03 1- The pilot of the single-engine airplane should give way; the other airplane is to the left.

2- Each pilot should alter course to the right; safety requires constant vigilance.

3- The pilot of the single-engine airplane should give way; the single-engine airplane is more maneuverable.

4- The pilot of the multiengine airplane should give way; the single-engine airplane is to the right.

069. May an airplane be operated in formation flight while passengers are carried for hire?

D-02 1- Yes, if operating outside controlled airspace.

2- Yes, provided arrangements have been made with the other pilot/pilots.

3- Yes, if the passengers approve.

4- No, this is not authorized.

070. Formation flight while carrying passengers for hire is

D-02 1- authorized, if previous arrangements have been made with the other pilot/pilots.

2- not authorized under any circumstances.

3- not authorized, except when operating outside of controlled airspace.

4- authorized if the passengers are so informed prior to the flight.

071. Which of the following general aviation operations require an operable emergency locator transmitter be attached to the airplane used?

C-35 1- Training flights that remain within a 20-mile radius of the airport.

2- Agricultural aircraft operations.

3- Commercial operations which are governed by Part 135.

4- Commercial operations flown over designated mountainous areas only.

072. Unless coordinated with ATC, operational testing of emergency locator transmitters should be made only within the

C-35 1- first 10 minutes after any hour.
2- last 10 minutes before any hour.
3- first 5 minutes after any hour.
4- last 5 minutes before any hour.

073. The expiration date for batteries used in emergency locator transmitters can be found on the

C-35 1- Airworthiness Certificate.
2- outside of the transmitter.
3- radio station license.
4- instrument panel.

074. Nonrechargeable batteries used in emergency locator transmitters must be replaced before what percent of their useful life has expired?

C-35 1- 90%.
2- 75%.
3- 50%.
4- 25%.

075. What is the maximum cumulative time an emergency locator transmitter can be operated before the nonrechargeable batteries must be replaced?

C-35 1- 2 hours.
2- 1 hour.
3- 45 minutes.
4- 30 minutes.

076. Rechargeable batteries used in emergency locator transmitters must be recharged before what percent of the useful life of their charge has been depleted?

C-35 1- 90%.
2- 75%.
3- 50%.
4- 25%.

077. The maximum cumulative time that an emergency locator transmitter may be operated before the rechargeable battery must be recharged is

C-35 1- 45 minutes.
2- 30 minutes.
3- 2 hours.
4- 1 hour.

078. Which of the following aircraft requires an altitude alerting system or device when being operated?

C-34
1- All transport type airplanes.
2- All airplanes with a gross weight of more than 12,500 pounds.
3- All airplanes except those used for training.
4- All turbojet powered airplanes.

079. Unless authorized, a "restricted category" civil aircraft should not be operated within

C-28
1- control zones.
2- congested airways.
3- control areas.
4- transition areas.

080. Unless authorized, a "restricted category" civil aircraft should not be operated over

C-28
1- designated mountainous areas.
2- large bodies of water.
3- densely populated areas.
4- any airport.

081. The carriage of passengers for hire by a commercial pilot is

C-28
1- not authorized in limited category aircraft.
2- authorized in restricted category aircraft.
3- not authorized in utility category aircraft.
4- authorized in experimental category aircraft.

082. Approved flotation gear, readily available to each occupant, is required on each airplane if it is being flown

C-23
1- for hire over water, but only when beyond 25 NM from shore.
2- for hire over water, regardless of the distance flown from shore.
3- for hire over water beyond power-off gliding distance from shore.
4- for hire over water, but only when beyond 50 NM from shore.

083. What equipment is required if an airplane is operated for hire on a day VFR flight conducted over water and beyond power-off gliding distance from shore?

C-23
1- Approved flotation gear readily available to each occupant only if the aircraft is flown beyond 50 NM from shore.
2- Approved flotation gear readily available to each occupant, and at least one pyrotechnic signaling device.
3- A sensitive altimeter adjustable for barometric pressure.
4- An approved system of dispensing at least two different colors of water dye.

084. When conducting VFR operations at night for hire, the aircraft must be equipped with at least

C-23
1- a flashing strobe on the vertical fin.
2- an attitude indicator.
3- one landing light.
4- a sensitive altimeter.

085. Which is required equipment for powered aircraft during VFR night flights?

C-23
1- Anticollision light system.
2- Appropriate radio navigational equipment.
3- Gyroscopic direction indicator.
4- Gyroscopic pitch and bank indicator.

086. Which is required equipment for powered aircraft during VFR night flights?

C-23
1- Sensitive altimeter adjustable for barometric pressure.
2- Flashlight with red lens.
3- Two-way radio communications system.
4- A landing light if the flight is for hire.

087. If ATC assigns an airspeed of 120 knots, the maximum variation from this assigned airspeed is

D-04
1- 100 knots to 140 knots.
2- 115 knots to 125 knots.
3- 105 knots to 135 knots.
4- 110 knots to 130 knots.

088. If ATC assigns an airspeed of 110 knots, the maximum variation from this assigned airspeed is

D-04
1- 105 knots to 115 knots.
2- 100 knots to 120 knots.
3- 95 knots to 125 knots.
4- 90 knots to 130 knots.

089. What is the maximum indicated airspeed allowed in the airspace underlying a Terminal Control Area or in a VFR corridor designated through a Terminal Control Area?

D-04
1- 200 knots.
2- 180 knots.
3- 156 knots.
4- 230 knots.

090. The maximum indicated airspeed permitted when operating a reciprocating engine aircraft within an airport traffic area which is located outside of a Terminal Control Area is

D-04
1- 156 knots.
2- 180 knots.
3- 200 knots.
4- 230 knots.

091. Unless otherwise authorized, what is the maximum indicated airspeed at which a person may operate an aircraft below 10,000 feet MSL?

D-04
1- 156 knots.
2- 200 knots.
3- 230 knots.
4- 250 knots.

092. Suppose an airplane and an airship are converging with the airship to the left of the airplane. Which aircraft has the right-of-way?

D-03
1- The pilot of the airplane should give way; the airship is to the left.
2- The airship has the right-of-way.
3- Each pilot should alter course to the right; safety requires constant vigilance.
4- The airplane has the right-of-way; it is more maneuverable.

093. If on a night flight the pilot of airplane A observes only the green wingtip light of airplane B, and the airplanes are converging, which airplane has the right-of-way?

D-03
1- Airplane B; it is to the right of airplane A.
2- Airplane A; it is to the right of airplane B.
3- Airplane B; it is to the left of airplane A.
4- Airplane A; it is to the left of airplane B.

094. If airplane A is overtaking airplane B, which airplane has the right-of-way?

D-03
1- Airplane A, and it should alter course to the right to pass.
2- Airplane B, and it should expect to be passed on the right.
3- Airplane A, and it should alter course to the left to pass.
4- Airplane B, and it should expect to be passed on the left.

095. If on a night flight the pilot of airplane A observes only the red wingtip light of airplane B, and the airplanes are converging, which airplane has the right-of-way?

D-03
1- Airplane A; it is to the right of airplane B.
2- Airplane B; it is to the left of airplane A.
3- Airplane A; it is to the left of airplane B.
4- Airplane B; it is to the right of airplane A.

096. After declaring an emergency with ATC and being given priority over other air traffic, a landing is made without incident. In this case

D-07
1- the pilot shall, under all circumstances, submit a detailed report of that emergency to the chief of the FAA facility involved.
2- a written report is not required unless the aircraft was damaged.
3- a detailed report must be submitted to the nearest General Aviation District or Regional Office of the FAA within 7 days.
4- the pilot shall, if requested by ATC, submit a detailed report of that emergency within 48 hours to the chief of that ATC facility.

097. No person may operate an aircraft at night unless lighted position lights are displayed during the period

D-06
1- from 1 hour after sunset until 1 hour before sunrise.
2- from 1 hour before sunset until 1 hour after sunrise.
3- in which the visibility falls below VFR minimums.
4- from sunset to sunrise.

098. Aircraft position lights are required to be lighted starting at

D-06
1- sunset to sunrise.
2- 1 hour after sunset to 1 hour before sunrise.
3- 30 minutes after sunset to 30 minutes before sunrise.
4- 30 minutes before sunset to 30 minutes after sunrise.

099. Maneuvers not necessary for normal flight such as abrupt changes in an aircraft's attitude, an abnormal attitude, or abnormal acceleration, are permitted in airplanes certificated in

D-05
1- utility category.
2- limited category.
3- acrobatic category.
4- any category.

100. What is the minimum altitude required for acrobatic flight?

D-05
1- 3,000 feet AGL.
2- 2,000 feet MSL.
3- 1,500 feet AGL.
4- 1,000 feet MSL.

101. What is the minimum flight visibility required for acrobatic flight?

D-05
1- 5 miles.
2- 3 miles.
3- 2 miles.
4- 1 mile.

102. While engaging in acrobatics, in addition to observing the minimum altitudes, restricted areas, etc., the pilot must make certain that

D-05
1- no precipitation is falling.
2- there is no danger of collision with other aircraft.
3- all maneuvers are started into the wind.
4- the fuel tanks are equipped for inverted flight.

103. If ATC assigns an airspeed of 140 knots, the maximum variation from this assigned airspeed is

D-04
1- 130 knots to 150 knots.
2- 133 knots to 147 knots.
3- 135 knots to 145 knots.
4- 140 knots to any speed less than 140 knots.

104. If ATC assigns an airspeed the pilot is expected to maintain an airspeed of

D-04
1- plus or minus 5 knots of the assigned airspeed.
2- plus or minus 10 knots of the assigned airspeed.
3- plus or minus 5 percent of the assigned airspeed.
4- plus or minus 10 percent of the assigned airspeed.

105. An alternating green and red light followed by a flashing red light is received from the control tower while on the final approach. Under these circumstances, the pilot should

D-08
1- abandon the approach and reenter the traffic pattern using right-hand turns.
2- abandon the approach, realizing the airport is unsafe for landing.
3- abandon the approach, fly the same traffic pattern again, and land.
4- land and clear the runway in use as safely and quickly as possible.

106. A flashing green light from the control tower during flight means

D-08
1- continue, but exercise caution.
2- continue, because this light signal is not applicable to aircraft in flight.
3- return for a landing, and expect an alternating red and green light at the proper time.
4- return for a landing, and expect a steady green light at the proper time.

107. A flashing red light from the control tower during a landing approach means

D-08
1- the airport is unsafe; do not land.
2- land; exercise extreme caution.
3- give way to other traffic.
4- give way to faster traffic; circle until cleared.

108. If a flashing red light from the tower is received while holding on a runway for takeoff, the pilot should

D-08
1- take off immediately.
2- hold the position.
3- taxi clear of the runway.
4- return to the starting point.

109. Assume that a pilot operating VFR is assigned a vector and an altitude by ATC. The pilot should

D-07
1- not enter clouds, but should deviate so as to maintain VFR conditions; advising ATC is not necessary.
2- enter clouds if the sky condition is observed as scattered.
3- enter clouds if instrument rated.
4- not enter clouds, and should advise ATC that VFR conditions cannot be maintained.

110. Assume that a pilot who has been instructed to maintain VFR conditions is assigned a vector and an altitude by ATC. This pilot should

D-07
1- deviate from the assigned heading to avoid entering the clouds, but should maintain the assigned altitude.
2- deviate from the assigned altitude to avoid entering clouds, but should maintain the assigned heading.
3- not enter the clouds, and should advise ATC that VFR conditions cannot be maintained.
4- maintain both the assigned heading and altitude, and should enter the clouds, if instrument rated.

111. A pilot given landing priority by ATC after declaring an emergency in flight is

D-07
1- not required to submit a written report unless there was damage to the aircraft.
2- not required to submit a report of the emergency, unless requested by the Administrator of the FAA.
3- required, if requested by ATC, to submit a detailed report of the emergency to the chief of that ATC facility within 48 hours.
4- required to make a written report of the emergency to the nearest General Aviation District Office.

112. If an airport without a control tower is located within the Airport Traffic Area of an airport which has an operating control tower, ATC authorization is required for landing at

D-13
1- both airports and for flight through the area.
2- the Tower-controlled airport only, and for flight through the area.
3- both airports but not for flight through the area.
4- the tower-controlled airport only but not for flight through the area.

113. Operation within an Airport Traffic Area require ATC authorization for landing at

D-13
1- any airport within the area and for flight through the area.
2- any airport within this area, but not for flight through the area.
3- a tower-controlled airport only, but not for flight through the area.
4- a tower-controlled airport only and for flight through the area.

114. The minimum altitude at which a sensitive altimeter should be set to 29.92" Hg is

D-10
1- 22,500 feet MSL.
2- 18,000 feet MSL.
3- 12,500 feet MSL.
4- 10,000 feet MSL.

115. When flying below 18,000' in an aircraft having no radios, cruising altitude must be maintained by reference to an altimeter adjusted to

D-10
1- an altimeter setting of 29.92" Hg.
2- zero altitude prior to departure.
3- the elevation of any airport within 100 NM.
4- the elevation of the departure airport.

116. If an altimeter setting is not available at a departure airport, the sensitive altimeter should be set to indicate

D-10
1- the elevation of the departure airport corrected to mean sea level.
2- pressure altitude corrected for nonstandard temperature.
3- the elevation of the departure airport.
4- 29.92" Hg.

117. If the final approach path crosses over a powerline which is 200 feet in height, what is the minimum altitude to be maintained above this powerline during an approach for a landing?

D-09
1- Any altitude that assures adequate clearance.
2- 500 feet above the powerline.
3- 1,000 feet above the powerline.
4- 2,000 feet above the powerline.

118. What is the minimum safe altitude above the highest obstacle that must be maintained over congested areas?

D-09
1- 500 feet.
2- 1,000 feet.
3- 1,500 feet.
4- 2,000 feet.

119. The minimum safe altitude which applies anywhere is

D-09
1- 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.
2- an altitude which permits a safe landing in the event of an emergency.
3- 500 feet above the surface, except over open water or sparsely populated areas.
4- 500 feet above the surface.

120. The minimum flight visibility for VFR flight increases from 3 to 5 miles beginning at and above an altitude of

D-25 1- 18,000 feet MSL.
2- 14,500 feet MSL.
3- 10,000 feet MSL.
4- 1,200 feet AGL.

121. What distance from clouds must be maintained when operating an aircraft outside controlled airspace at an altitude above 1,200 feet AGL but less than 10,000 feet MSL?

D-25 1- 1,000 feet above or 1,000 feet below and 1 mile horizontally.
2- 1,000 feet above or 500 feet below and 2,000 feet horizontally.
3- 500 feet above or 1,000 feet below and 2,000 feet horizontally.
4- Clear of clouds.

122. Flight within a Positive Control Area should be conducted under

D-19 1- VFR or IFR depending upon pilot qualifications and recent experience.
2- VFR or IFR if the aircraft is equipped with a radar beacon transponder.
3- IFR only and at a specific flight level assigned by ATC.
4- VFR except when weather is less than the required basic VFR minimums.

123. A disaster area within which a "Temporary Flight Restriction" is in effect can be determined by referring to

D-16 1- Federal Aviation Regulation, Part 91.
2- AIRMETS.
3- Airman's Information Manual.
4- Notices to Airmen.

124. What is the correct departure procedure at a nontower airport?

D-14 1- Any FAA approved departure procedure for that airport.
2- Depart as prearranged with other pilots using the airport.
3- Make all left turns, except a 45° right turn on the first crosswind leg.
4- Departure in any direction consistent with safety, after crossing the airport boundary.

125. At a nontower airport, a flashing amber light near the center of the segmented circle indicates that

D-14 1- the airport is below special VFR weather minimums.
2- a right traffic pattern is in effect.
3- the airport is below basic VFR weather minimums.
4- a left traffic pattern is in effect.

126. When approaching to land at an airport with an operating control tower, the pilot of an airplane must, unless otherwise directed,

D-13 1- initially enter the base leg of the active runway.
2- circle the airport to the left.
3- circle the airport to the right.
4- initially enter the downwind leg of the active runway.

127. If an airport without a control tower is located within an Airport Traffic Area, ATC authorization is required for landing at

D-13 1- the tower-controlled airport only, but not for flight through the area.
2- both airports but not for flight through the area.
3- both airports and for flight through the area.
4- the tower-controlled airport only, and for flight through the area.

128. If an aircraft's operation in flight was substantially affected by an alteration or repair, the aircraft documents must show that it was test flown and approved for return to service by an appropriately rated pilot prior to being operated

E-03 1- away from the vicinity of the airport.
2- with passengers aboard.
3- for compensation or hire.
4- by any private pilot.

129. Frequent inspections should be made of aircraft exhaust manifold type heating systems to minimize the possibility of

E-02 1- a power loss due to leaking exhaust connections.
2- a cold-running engine due to the heat withdrawn by the heater
3- a power loss due to back pressure in the exhaust system.
4- exhaust gases leaking into the cockpit.

130. What information from the aircraft maintenance records must be retained for an indefinite period of time?

E-06 1- The signature of the person approving the aircraft for return to service.
2- The total time in service of the airframe.
3- The completion date of any work performed on the aircraft.
4- The description of work performed on the aircraft.

131. Assuring compliance with an Airworthiness Directive is the responsibility of the

E-02 1- FAA maintenance inspector.
2- pilot in command.
3- National Transportation Safety Board.
4- owner or operator.

132. Who is responsible for determining when maintenance is to be performed on an aircraft?

E-02 1- FAA certificated mechanic.
2- Pilot in command.
3- Owner or operator.
4- Maintenance personnel.

133. Who is primarily responsible for maintaining an aircraft in an airworthy condition?

E-01 1- Owner only.
2- Pilot in command.
3- Operator or owner of the aircraft.
4- Mechanic who signs the maintenance records.

134. Automatic pressure altitude reporting equipment must be deactivated when

D-37 1- directed by ATC.
2- VFR within Terminal Control Areas.
3- VFR within a Control Zone.
4- operating within an Airport Traffic Area.

135. The altitudes to be maintained for VFR level cruising flight are required when

D-27 1- more than 3,000 feet above MSL, and are based on true heading.
2- at 3,000 feet or more above MSL, and are based on magnetic heading.
3- at 3,000 feet or more AGL, and are based on true course.
4- more than 3,000 feet AGL, and are based on magnetic course.

136. The appropriate altitudes required by regulations relating to VFR level cruising flight begin above

D-27 1- 3,000 feet MSL, and are based on true heading.
2- 3,000 feet AGL, and are based on magnetic course.
3- 3,000 feet MSL, and are based on magnetic heading.
4- 3,000 feet AGL, and are based on true course.

137. Altitudes are referred to as flight levels starting from

D-27
1- 29,000 feet MSL.
2- 18,000 feet MSL.
3- 14,500 feet MSL.
4- 10,000 feet MSL.

138. At some airports located within control zones where ground visibility is not reported, takeoffs and landings of airplanes under special VFR are

D-26
1- not authorized.
2- authorized only if the ground visibility is observed to be at least 3 miles.
3- authorized by ATC if the flight visibility is at least 1 mile.
4- not subject to visibility requirements.

139. A special VFR clearance to enter a control zone requires that while in the control zone the pilot remain

D-26
1- clear of all clouds.
2- at least 2,000 feet from all clouds.
3- at least 1,000 feet from all clouds.
4- at least 500 feet from all clouds.

140. No person may operate an airplane in a control zone under a special VFR clearance at night unless that person

D-26
1- enters the Airport Traffic Area at or above 1,500 feet AGL and maintains that altitude until descending for a landing.
2- holds at least a commercial pilot certificate and an instrument rating.
3- uses the runway which is served by an operating Visual Approach Slope Indicator.
4- meets the applicable requirements for instrument flight and the airplane is equipped as required for instrument flight.

141. Special VFR minimums apply to operations within what type airspace?

D-26
1- Control Zones.
2- Control Areas.
3- Airport Traffic Areas.
4- Restricted Areas.

142. A special VFR clearance requires that while in the control zone, you remain

D-26
1- clear of clouds.
2- at least 1,500 feet from clouds.
3- at least 1,000 feet from clouds.
4- at least 500 feet from clouds.

143. What is the minimum flight visibility and proximity to cloud requirements for VFR flight, at 6,500 feet MSL, in a Control Area?

D-25
1- 1,000 feet under or 500 feet over; 1 mile visibility.
2- 1,000 feet over or 500 feet under; 1 mile visibility.
3- 1,000 feet under or 500 feet over; 3 miles visibility.
4- 1,000 feet over or 500 feet under; 3 miles visibility.

144. To operate an airplane VFR outside controlled airspace at an altitude of more than 1,200 feet AGL but less than 10,000 feet MSL, the minimum flight visibility is

D-25
1- 5 miles.
2- 3 miles.
3- 2 miles.
4- 1 mile.

145. What is the minimum basic VFR flight visibility for all flights at or above 10,000 feet MSL except when less than 1,200 feet AGL?

D-25
1- 5 miles.
2- 3 miles.
3- 3 miles during daylight hours, and 5 miles during hours of darkness.
4- 1 mile in uncontrolled airspace, and 3 miles in controlled airspace.

DETROIT TERMINAL CONTROL AREA
GROUP 2

SECTIONAL AERONAUTICAL CHART
SCALE 1:500,000

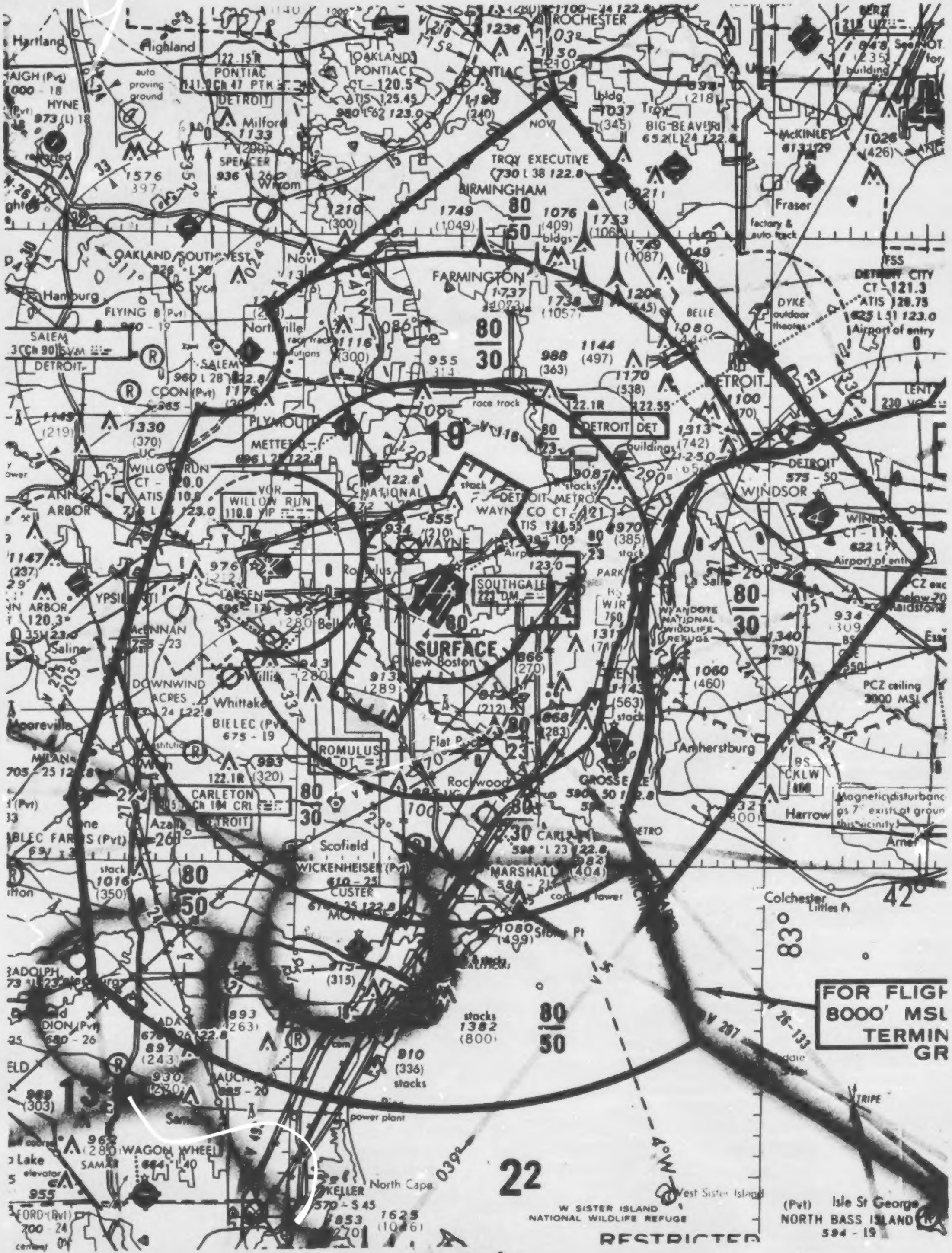

Hartland
Highland
PONTIAC
OAKLAND PONTIAC
CT - 120.5
ATIS 125.45
Milford
SPENCER
ROCHESTER
Utica
Troy
TROY EXECUTIVE
BIG BEAVER
McKINLEY
BIRMINGHAM
80
50
Fraser
factory & auto track
OAKLAND/SOUTHWEST
Novi
Hamburg
FLYING 8 (Pvt)
SALEM
DETROIT
Northville
FARMINGTON
80
30
DETROIT CITY
CT - 121.3
ATIS 120.75
Airport of entry
DYKE outdoor theater
COON (Pvt)
PLYMOUTH
race track
19
DETROIT DET
WILLOW RUN
CT - 120.0
VOR WILLOW RUN 110.0
ANN ARBOR
NATIONAL
DETROIT METRO WAYNE CO CT
WAYNE
DETROIT
WINDSOR
Airport of entry
YPSILANTI
SOUTHGATE
80
SURFACE
New Boston
WYANDOTE NATIONAL WILDLIFE REFUGE
La Salle
80
30
McLENNAN
Saline
DOWNWIND ACRES
Whittaker
BIELEC (Pvt)
ROMULUS
Flat Rock
Rockwood
GROSSE ILE
Amherstburg
PCZ ceiling 3000' MSL
Harrow
Magnetic disturbance as 7° exists at ground this vicinity
Milan
CARLETON
80
30
Scofield
WICKENHEISER (Pvt)
CUSTER
MONROE
MARSHALL
80
50
Colchester
42°
83°
FOR FLIGHT
8000' MSL
TERMINAL
GR
stacks
80
50
power plant
WAGON WHEEL
SAMARIA
North Cape
KELLER
22
W SISTER ISLAND NATIONAL WILDLIFE REFUGE
West Sister Island
Isle St George
NORTH BASS ISLAND
RESTRICTED
V 287
4° W

Figure 41

146. Which statement is true regarding ATC authorization for VFR flights through Terminal Control Areas such as depicted by Figure 1?

D-15
1- ATC authorization is not mandatory if the control zones are avoided.
2- ATC authorization is mandatory.
3- ATC authorization is encouraged but is not mandatory.
4- ATC authorization is mandatory only when weather conditions are less than VFR minimums.

147. The maximum indicated airspeed at which flight can be made beneath the lateral limits of a Terminal Control Area such as depicted by Figure 1, is

D-04
1- 156 knots.
2- 200 knots.
3- 230 knots.
4- 250 knots.

148. The maximum indicated airspeed for flight within an airport traffic area located within a Terminal Control Area such as Detroit Metro, Figure 1, is

D-04
1- 156 knots.
2- 200 knots.
3- 230 knots.
4- 250 knots.

149. Refer to Figure 1. Select the lowest appropriate altitude to fly VFR over the Detroit TCA from the southwest to the northeast and remain above this TCA.

D-15
1- 8,000 feet MSL.
2- 8,500 feet MSL.
3- 9,000 feet MSL.
4- 9,500 feet MSL.

150. The maximum indicated airspeed at which flight can be made into a Terminal Control Area such as depicted by Figure 1, is

D-04
1- 156 knots.
2- 200 knots.
3- 230 knots.
4- 250 knots.

151. Refer to Figure 1. What altitude must be flown to remain below the Terminal Control Area when departing VFR northbound from National Airport (located northwest of Detroit Metro)?

D-15
1- 8,000 feet AGL until reaching a point which is 16 NM from Detroit Metro Airport.
2- 3,000 feet MSL until reaching a point which is 16 NM from Detroit Metro Airport.
3- 2,300 feet MSL until reaching a point which is 10 NM from Detroit Metro Airport.
4- 2,300 feet AGL until reaching a point which is 10 NM from National Airport.

152. ATC radar headings and altitude assignments when operating VFR within a Terminal Control Area, such as depicted by Figure 1, authorize the pilot to fly

D-15
1- into clouds within the TCA.
2- in visibility conditions that are less than 3 miles.
3- closer than 500 feet below the clouds.
4- within the TCA provided basic VFR separation from clouds can be maintained.

153. Which statement is true regarding VFR departures from airports within a Terminal Control Area such as the Detroit Metro Airport depicted by Figure 1?

D-15
1- Pilots are required to request the route and altitude of the intended departure through filing a VFR flight plan.
2- Pilots should advise the ground controller of the intended altitude and departure route.
3- Pilots should advise ATIS of the intended altitude and departure route.
4- Pilots should advise the Control Tower of the intended altitude and departure route.

154. Which statement is true regarding the keeping of preventive maintenance records for an aircraft?

E-06

1- There is no requirement to retain these records unless the aircraft is used for hire.

2- These records are required to be kept in a bound logbook.

3- There is no requirement to retain these records.

4- These records are required to be kept in some form for at least 24 calendar months.

155. After an altimeter system has been inspected, the person approving the aircraft for return to service must record the

E-05

1- error at each 1,000-foot level.

2- maximum altitude to which the altimeter has been tested.

3- error at each 5,000-foot level.

4- minimum altitude at which the altimeter has been tested.

156. After 110 hours' time in service, a 100-hour inspection was completed on an airplane that is used for hire. The next 100-hour inspection will be due within

E-04

1- 10 hours' time in service.
2- 90 hours' time in service.
3- 100 hours' time in service.
4- 110 hours' time in service.

157. If the 100-hour inspection period was exceeded by 7 hours, the next 100-hour inspection is due within how many hours' time in service?

E-04

1- 90 hours.
2- 93 hours.
3- 97 hours.
4- 107 hours.

158. After only 80 hours' time in service, an annual inspection was completed on an airplane which is operated for hire. The next 100-hour inspection will be due within

E-04

1- 20 hours' time in service.
2- 80 hours' time in service.
3- 100 hours' time in service.
4- 120 hours' time in service.

159. Which statement is true regarding the use of recording tachometers to indicate time in service?

E-04

1- These devices can be used to replace required aircraft maintenance records to determine time in service.

2- These devices cannot be used to replace required aircraft maintenance records indicating time in service.

3- These devices can be used to determine only when engine maintenance is due in lieu of maintenance records.

4- These devices can be used to determine only when airframe maintenance is due in lieu of maintenance records.

160. Assume an airplane is given a 100-hour inspection 10 hours past due. If the time in service is 1870 hours at the time of the inspection, the next 100-hour inspection would be due at what time in service?

E-04

1- 1940 hours.
2- 1950 hours.
3- 1960 hours.
4- 1970 hours.

161. The validity of the Airworthiness Certificate is maintained by

E-04

1- an appropriate "return to service" statement in the aircraft maintenance records upon the completion of required inspections.

2- applying for a new Airworthiness Certificate each year, prior to its expiration date.

3- performance of an annual and a 100-hour inspection prior to their expiration date.

4- performance of an annual inspection.

162. Before passengers can be carried in an aircraft that has been altered in a manner that may have appreciably changed its flight characteristics, a test flight is required by at least an appropriately rated

E-03

1- commercial pilot with an instrument rating.

2- private pilot.

3- commercial pilot.

4- commercial pilot with a mechanic's certificate.

163. After January 1, 1976, no person may use an ATC transponder in an airspace which requires a transponder, unless that transponder has passed an inspection within the preceding

E-08
1- 48 calendar months.
2- 36 calendar months.
3- 30 calendar months.
4- 24 calendar months.

164. Old maintenance records of an engine may be discarded when that engine is

E-07
1- overhauled.
2- rebuilt.
3- reconditioned.
4- remanufactured.

165. A new maintenance record being used for a rebuilt aircraft engine must include previous

E-07
1- operating history of the engine.
2- operating hours of the engine.
3- annual inspections performed on the engine.
4- changes as required by Airworthiness Directives.

166. Which of the following is correct concerning preventive maintenance, when accomplished by a pilot?

E-06
1- Records of preventive maintenance must be kept in the aircraft.
2- Records of preventive maintenance must be entered in a bound logbook.
3- A record of preventive maintenance is required.
4- A record of preventive maintenance is not required.

167. Aircraft maintenance records must include the current status of the

E-06
1- life-limited parts of only the propeller and appliances.
2- life-limited parts of only the engine and airframe.
3- applicable Airworthiness Certificate.
4- life-limited parts of each airframe engine, propeller, and appliance.

168. Ensuring that the appropriate entries are made in the maintenance records releasing the aircraft for service is the responsibility of the

E-06
1- FAA maintenance inspector.
2- owner/operator of the aircraft.
3- maintenance personnel.
4- pilot in command.

169. What information from the aircraft maintenance records may be discarded after the maintenance has been repeated or superseded by other maintenance?

E-06
1- The current status of applicable Airworthiness Directives.
2- The time since the last required overhaul.
3- The description of the maintenance performed.
4- The list of current major alterations to the aircraft.

170. What information from the aircraft maintenance records must be transferred with the aircraft at the time it is sold?

E-06
1- The current status of all applicable Airworthiness Directives.
2- The signature and certificate number of each person who has approved the aircraft for return to service.
3- A description of all work performed on the aircraft.
4- The date of completion of all work which has been performed on the aircraft.

171. The expiration date of an annual inspection can be determined from the date of the last inspection as entered in the

E-06
1- Aircraft Use and Inspection Report.
2- Aircraft and Engine Maintenance Records.
3- Repair and Alteration Form.
4- Airworthiness Certificate.

172. Procedures regarding aircraft accident reports are found in

H-01 1- NTSB regulation, Part 830.
2- FAR Part 91, General Operating and Flight Rules.
3- FAR Part 99, Security Control of Air Traffic.
4- FAR Part 135, Air Taxi Operators and Commercial Operators of Small Aircraft.

173. Airplane accident reporting rules are contained in

H-01 1- Federal Aviation Regulations, Part 1.
2- Federal Aviation Regulations, Part 91.
3- Federal Aviation Regulations, Part 61.
4- National Transportation Safety Board regulation, Part 830.

174. Part 135, Federal Aviation Regulations, Air Taxi Operators and Commercial Operators of Small Aircraft, does not apply to

G-01 1- the carrying of property only for compensation or hire.
2- pipeline or powerline patrol operations.
3- transportation of mail under a "star route" contract.
4- the carrying of persons or property for compensation or hire in air commerce.

175. Part 135, Federal Aviation Regulations, governing air taxi operators and commercial operators of small aircraft, applies to which operation?

G-01 1- Carrying weekend skiers for hire to another state.
2- A pipeline patrol flown by a commercial pilot hired by the company which owns both the pipeline and airplane.
3- Student instruction for hire at an approved school.
4- Aerial work including crop dusting and spraying.

176. Part 135 regulations governing interstate air commerce apply to flights conducted

G-01 1- between Mexico and the United States.
2- between locations in the same state through the airspace of another state.
3- only from one state into and terminating in another state.
4- from one state into another state, excluding the District of Columbia.

177. Assume an airplane departs an airport in one state, navigates through the airspace of another state, and lands in the state of original departure. If this airplane weighs less than 12,500 lbs., and is carrying passengers for hire, what regulation would govern this flight?

G-01 1- Air Taxi Operators and Commercial Operators of Small Aircraft, Part 135.
2- Only General Operating and Flight Rules, Part 91, applying to small aircraft.
3- Only Certification: Pilots and Flight Instructors, Part 61; and General Operating Flight Rules, Part 91, applying to small aircraft.
4- Certification and Operations: Air Carriers and Commercial Operators of Large Aircraft, Part 121.

178. Part 135 of the Federal Aviation Regulations applies to which operation?

G-01 1- Aerial work operations for compensation, such as crop dusting, aerial photography, rescue, and pipeline patrol.
2- Civil aircraft being ferried to a foreign country.
3- Commercial operations in small aircraft other than air carrier.
4- Commercial operations in small aircraft including air carrier.

179. Operation of an airport rotating beacon during the hours of daylight would mean

J-02
1- that weather in the control zone is below basic VFR weather minimums.
2- that takeoffs and landings only are authorized at the present time.
3- nothing to the pilot because these beacons operate continuously.
4- right-hand traffic is in effect.

180. To comply with regulations, which incident would require an immediate notification?

H-03
1- Damage to the landing gear as a result of a hard landing.
2- Generator failure in flight which results in the loss of the electrical system.
3- Any electrical fire occurring during flight.
4- Engine failure for any reason during flight.

181. Assume that during flight a fire, which was extinguished, burned the insulation from a transceiver wire. What action is required by regulations?

H-03
1- A notification only if requested by the National Transportation Safety Board.
2- An immediate notification by the operator of the aircraft to the nearest National Transportation Safety Board field office.
3- No notification or report is required.
4- An immediate landing at the most practical airport, and an immediate notification filed with the nearest FAA field office.

182. Notification to the NTSB is required whenever there has been any damage

H-03
1- which requires repairs to landing gear or flaps.
2- which adversely affects structural strength or flight characteristics.
3- to an engine caused by engine failure in flight.
4- caused by collision with another aircraft on the ground.

183. Assume while taxiing for takeoff a small fire burned the insulation from a transceiver wire. What action would be required to comply with NTSB regulations?

H-03
1- A notification only if requested by the NTSB.
2- An immediate notification by the operator of the aircraft to the nearest NTSB field office.
3- No notification or report is required.
4- An immediate report must be filed with the nearest FAA field office.

184. When should notification of an accident be made, if the accident resulted in substantial damage to the airplane?

H-03
1- Within 30 days.
3- Within 10 days.
3- Only when requested.
4- Immediately.

185. National Transportation Safety Board regulation requires an immediate notification as a result of which incident?

H-03
1- Generator failure in flight which results in the loss of the electrical system.
2- Damage to the landing gear as a result of a hard landing.
3- Engine failure for any reason during flight.
4- Any required flight crewmember being unable to perform flight duties because of illness.

186. Information concerning the reporting of an accident which has resulted in substantial damage to an airplane can be found in

H-01
1- Federal Aviation Administration Compliance and Security Regulations.
2- Federal Aviation Regulations, Part 91.
3- National Transportation Safety Board regulation, Part 830, or the Airman's Information Manual.
4- Federal Aviation Regulations, Part 61, and Part 1 of the Airman's Information Manual.

187. The operation of aircraft is unauthorized within which of the following areas?

J-07 1- Restricted Areas.
2- Warning Areas.
3- Prohibited Areas.
4- All Special Use Airspace.

188. Information regarding activities within Military Operations Areas can be obtained from which facility?

J-07 1- A control tower located within 200 miles of the area.
2- Any Automatic Terminal Information Service (ATIS) located within 100 miles of the area.
3- A Ground Control located within 100 miles of the area.
4- Any Flight Service Station (FSS) within 200 miles of the area.

189. One of the most effective means of avoiding potential conflict with military aircraft using VFR Low Altitude Training Routes, is to maintain an altitude

J-07 1- of less than 1,000 feet AGL.
2- of less than 1,500 feet MSL.
3- greater than 1,000 feet MSL.
4- greater than 1,500 feet AGL.

190. Pilot participation in the airport advisory service program is

J-06 1- not mandatory, but strongly recommended.
2- mandatory for all aircraft landing at the primary airport.
3- not mandatory, except for aircraft on a VFR flight plan.
4- mandatory for all aircraft entering this area.

191. What type of facility is located within an Airport Advisory Area?

J-06 1- An operating control tower.
2- A Flight Service Station.
3- An Automatic Terminal Information Service.
4- An Approach Control.

192. How many miles from an airport does an Airport Advisory Area extend?

J-06 1- 5 statute miles.
2- 10 statute miles.
3- 10 nautical miles.
4- 15 nautical miles.

193. Transition areas are designated for the purpose of

J-05 1- controlling all aircraft within 25 miles of an airport that lies within a control zone.
2- containing IFR operations within controlled airspace during specific operations.
3- separating control zones from the control areas.
4- extending control zones laterally from 5 to 25 miles from the primary airport.

194. A transition area designated in conjunction with an airport having prescribed instrument approaches has vertical limits from

J-05 1- 700 feet AGL to the overlying control area.
2- the surface to 700 feet AGL.
3- the surface to 1,200 feet AGL.
4- 1,200 feet AGL to the overlying control area.

195. Assume while on an approach to a runway equipped with a Visual Approach Slope Indicator the colors change from yellow to green to red. This means that the airplane is

J-04 1- descending through the glidepath of a 3-bar VASI system.
2- descending through the glidepath of a tri-color VASI system.
3- ascending through the glidepath of a tri-color VASI system.
4- ascending through the glidepath of a 3-bar VASI system.

196. A pilot approaching to land an airplane on a runway served by a Visual Approach Slope Indicator (VASI) at an airport with an operating control tower shall

J-04 1- use the VASI only when weather conditions are below basic VFR.
2- use the VASI only when executing an approved instrument approach procedure.
3- not use the VASI unless a clearance for a VASI approach is received from the control tower.
4- maintain an altitude at or above the glide slope until a lower altitude is necessary for a safe landing.

197. Assume while on an approach to a runway equipped with a Visual Approach Slope Indicator, the colors change from red to green to yellow. This means that the airplane is

J-04
1- ascending through the glidepath of a 3-bar VASI system.
2- ascending through the glidepath of a tri-color VASI system.
3- descending through the glidepath of a 3-bar VASI system.
4- descending through the glidepath of a tri-color VASI system.

198. When on the proper glide slope of a standard 2-bar VASI installation, the far lights should be

J-04
1- white and the near lights should be red.
2- pink and the near lights should be pink.
3- red and the near lights should be white.
4- pink and the near lights should be white.

199. Regulations require that an airplane pilot approaching to land on a runway served by a Visual Approach Slope Indicator (VASI) shall use the VASI

J-04
1- and stay at or above the glide slope until a lower altitude is necessary for a safe landing.
2- only if a clearance for VASI approach is received from the control tower.
3- only when executing an approved instrument approach procedure.
4- only when weather conditions are below basic VFR.

200. While making an approach to a runway that has a VASI installation, all of the VASI lights are observed to be red. Under these conditions, the pilot should

J-04
1- ignore these lights as they apply to IFR flights only.
2- descend rapidly to reach the glidepath.
3- level off momentarily to reach the glidepath.
4- continue the same rate of descent.

201 Assume a pilot turns on final approach to a runway served by a Visual Approach Slope Indicator (VASI). The descent should be initiated

J-04
1- only after the aircraft is visually aligned with the runway.
2- only after a clearance is received from ATC for a VASI approach.
3- at any point in the approach where a red, red, indication is visible to the pilot.
4- at any point in the traffic pattern where at least two of the light bars are visible to the pilot.

202. What restriction may be represented by the operation of a rotating beacon during daylight hours in a control zone?

J-02
1- The airport is temporarily closed.
2- There are obstructions on the airport.
3- The tower is temporarily shut down.
4- A traffic clearance is required for takeoffs and landings.

203. Military airports are distinguishable from civil airports by light beacons which alternately flash dual peaked (two quick)

J-02
1- green flashes only.
2- yellow flashes between each white flash.
3- white flashes between each green flash.
4- green flashes between each white flash.

204. As given by control towers, what is the relationship between runway numbers and wind direction?

J-02
1- Runway numbers are given in magnetic direction and wind in true.
2- Runway numbers are given in true direction and wind in magnetic.
3- Both runway numbers and wind are given in magnetic direction.
4- Both runway numbers and wind are given in true direction.

ALABAMA

§ **BIRMINGHAM MUNI** (BHM) 4.3 NE GMT-6(-5DT) 33°33'47"N 86°45'20"W **ATLANTA**
643 B S4 **FUEL** 100, JET A B+ OX 2 LRA CFR Index C **H-4G, L-14H**
RWY 05-23: H10000X150 (ASPH-CONC) S-175, D-205, DT-350 HIRL **IAP**
RWY 05: ALSF1, VASI Arrest device
RWY 23: MALSR, VASI Arrest Device. Thld dsplcd 1770'. Trees 5900' from thld.
RWY 18-36: H4856X150 (ASPH-CONC) S-55, D-75, DT-120 HIRL Gradient. 59% up N.
RWY 18: P-line 2500' Thld dsplcd 475'. **RWY 36:** P-line 1990' from thld.
AIRPORT REMARKS: Attended continuously. A GEAR 1006' inbound thld Rwy 05 & 2397' from thld Rwy 23. MALSR Rwy 23 unmonitored but controlled by tower. Approach lights Rwy 23 controlled by Tower but operates unmonitored.
COMMUNICATIONS: UNICOM 123.0 **ATIS** 119.4
BIRMINGHAM FSS (BHM) on Arpt 123.65 122.2 122.1R 114.4T (205) 254-1387
Ⓡ **APP CON:** 124.5 (231°-049°) 124.9 (050°-230°)
TOWER: 119.9 **GND CON:** 121.7 **CLNC DEL:** 120.9 **PRE-TAXI CLNC:** 120.9
Ⓡ **DEP CON:** 124.5 (231°-049°) 124.9 (050°-230°)
STAGE III SVC ctc **APP CON**
RADIO AIDS TO NAVIGATION: VOT 110.0
VULCAN (H) VORTAC 114.4 VUZ Chan 91 33°40'12"N 86°53'59"W 127° 9.6 NM to fld
McDEN NDB (H-SAB) 224 BH 33°30'40"N 86°50'44"W 053° 4.5 NM to fld
ROEBY NDB (MHW) 201 RO 33°36'27"N 86°40'44"W 233° 4.0 NM to fld
ILS 110.3 I-BHM rwy 05 LOM McDEN NDB
ILS 109.5 I-ROE rwy 23 LOM Roeby NDB LOC only
ASR ctc **APP CON**

GEORGIA

THE WILLIAM B HARTSFIELD ATLANTA INTL (ATL) 6.1 S GMT-5(-4DT) **ATLANTA**
33°38'21"N 84°25'40"W **H-4G, L-20E, A-1A**
1026 B S4 **FUEL** 100, JET A OX 1, 2, 3, 4 LRA CFR Index D **IAP**
RWY 08-26: H10,000X150 (CONC) S-120, D-200, DT-360 HIRL, CL .55% up W
RWY 08: ALSF1, TDZ. Tree **RWY 26:** MALSR Tree
RWY 09R-27L: H9000X150 (CONC) S-120, D-200, DT-360 HIRL, CL .46% up W
RWY 09R: ALSF2, TDZ Concrete Silo **RWY 27L:** MALSR Tree
RWY 09L-27R: H8001X150 (CONC) S-120, D-200, DT-360 HIRL, CL .4% up W. Wire combed full length and 130' wide
RWY 09L: Building **RWY 27R:** VASI, Water tower
AIRPORT REMARKS: Attended continuously. Landing fee. Unlgtd 170' MSL twr 3 mi WNW.
COMMUNICATIONS: ATIS Arr 125.55 **Dep** 111.0T **UNICOM** 123.0
ATLANTA FSS (ATL)
ATLANTA LRCO 122.1R, 116.9T (Atlanta FSS)
Ⓡ **ATLANTA APP CON** 127.9 118.1 (090°-269°) S. ATL-VOR/E & W V97 below 8000'
126.9, 127.25 (270°-089°) N. ATL-VOR/E & W V97 below 8000'
ATLANTA TOWER 119.1, 119.5 123.85 **GND CON** 121.9, 121.75 **CLNC DEL** 121.65
Ⓡ **ATLANTA DEP CON** 125.7 (270°-089°) S-V18 above 11,500' 125.0 (090°-269°) S-V18 above 11,500.
TCA Group I: See VFR TERMINAL Area Chart
RADIO AIDS TO NAVIGATION: VOT 111.0
ATLANTA (H) VORTAC 116.9 ATL Chan 116 33°37'44"N 84°26'06.5"W at fld
REX (L) VORW/DME 111.8 REG Chan 55 33°38'42"N 84°15'42"W 270° 7.2 NM to fld
REDAN NDB (H-SAB) 266 • BR 33°38'43"N 84°18'41"W 270° 4.7 NM to fld
RED OAK NDB (MHW) 254 RHX 33°38'03"N 84°32'32"W 092° 4.7 NM to fld
CATTA NDB (LOM) 375 AL 33°38'48"N 84°32'32"W 090° 5.2 NM to fld
ILS 109.9 I-ATL RWY 08 LOM CATTA NDB
108.9 I-FUN RWY 09R
110.5 I-HZK RWY 09L
108.7 I-BRU RWY 26 LOM REDAN NDB
108.5 I-FSQ RWY 27L G.S. unusable below 1170'
ASR

Figure 2

205. Refer to Figure 2. Which is true regarding VFR departures from the Birmingham Mun. Airport?

J-09 1- Radio communication with Birmingham Departure Control is encouraged but not mandatory.
2- Radio communication with Birmingham clearance delivery must be made prior to departure.
3- The initial radio communication when departing Birmingham Mun. Airport must be made with the Birmingham Control Tower.
4- Radio communication with Birmingham Departure Control is mandatory.

206. Refer to Figure 2. Which is true regarding VFR arrivals to the Birmingham Mun. Airport?

J-09 1- Radio communication with Birmingham Approach Control is mandatory.
2- Radio communication with Birmingham ATIS is mandatory prior to landing.
3- The initial radio communication must be made with the Birmingham FSS.
4- Radio communication with Birmingham Approach Control is encouraged but not mandatory.

207. Refer to Figure 2. Which is true regarding VFR departures from the Atlanta Intl. Airport?

J-09 1- The initial radio communication when departing Atlanta Intl. Airport ramp must be made with the Atlanta Control Tower.
2- Radio communication with Atlanta Departure Control is encouraged but not mandatory.
3- Radio communication with Atlanta Departure Control is mandatory.
4- Radio communication with Atlanta ATIS is mandatory prior to takeoff.

208. Refer to Figure 2. Which is true regarding VFR arrivals to Atlanta Intl. Airport?

J-09 1- The initial radio communication must be made with Atlanta Control Tower.
2- Radio communication with Atlanta Approach Control is encouraged but not mandatory.
3- Radio communication with Atlanta Approach Control is mandatory.
4- Radio communication with Atlanta ATIS is mandatory prior to landing.

209. Refer to Figure 2. VFR arrivals to Birmingham Mun. Airport from the north should contact Birmingham Approach Control on frequency

J-09 1- 118.7 MHz.
2- 119.9 MHz.
3- 124.5 MHz.
4- 124.9 MHz.

210. Refer to Figure 2. VFR arrivals to Birmingham Mun. Airport from the south should contact Birmingham Approach Control on frequency

J-09 1- 118.7 MHz.
2- 119.9 MHz.
3- 124.5 MHz.
4- 124.9 MHz.

211. Refer to Figure 2. VFR arrivals to Atlanta Intl. Airport from the southwest should contact Atlanta Approach Control on frequency

J-09 1- 119.1 or 119.5 MHz.
2- 125.55 MHz.
3- 126.9 or 127.25 MHz.
4- 127.9 MHz.

212. Refer to Figure 2. VFR arrivals to Atlanta Intl. Airport from the northeast should contact Atlanta Approach Control on frequency

J-09 1- 118.1 or 127.9 MHz.
2- 119.1 or 119.5 MHz.
3- 125.55 MHz.
4- 126.9 MHz.

213. During normal VFR cruising flight at 12,500 feet MSL, unless otherwise advised by ATC, the transponder should be set to which code?

J-10 1- 0400.
2- 1000.
3- 1200.
4- 1400.

214. What minimum aircraft equipment is required to receive ATC radar advisory service?

J-10 1- Distance measuring equipment.
2- ATC transponder.
3- Two-way communication radio.
4- VOR or ADF receivers.

215. When a pilot accepts an ATC clearance to follow another aircraft to a landing, that pilot is responsible for maintaining

J-09 1- a minimun of 2 miles separation from all other aircraft in the traffic pattern.

2- a minimum of 2 minutes' elapsed time before landing behind another aircraft.

3- a minimum of 5 miles separation from all other aircraft in the traffic pattern.

4- wake turbulence separation.

216. If the visibility is included in an ATIS broadcast it indicates a visibility less than

J-08 1- 1 mile.
2- 2 miles.
3- 3 miles.
4- 5 miles.

217. If the sky condition or ceiling is omitted in an ATIS broadcast it indicates that the ceiling is

J-08 1- 2,000 feet or more.
2- 3,000 feet or more.
3- 4,000 feet or more.
4- 5,000 feet or more.

218. If the visibility is omitted in an ATIS broadcast it indicates that the visibility is

J-08 1- 1 mile or more.
2- 2 miles or more.
3- 3 miles or more.
4- 5 miles or more.

219. An ATIS broadcast includes sky condition and ceiling if the ceiling is less than

J-08 1- 5,000 feet.
2- 6,000 feet.
3- 7,000 feet.
4- 10,000 feet.

220. Pilot use of the phrase "HAVE NUMBERS" when communicating with a control tower indicates that the pilot has received

J-08 1- the ATIS broadcast.
2- wind and runway information only.
3- the airport ceiling and visibility.
4- the appropriate tower frequency.

221. The absence of a sky condition/ceiling on an ATIS broadcast indicates a sky condition/ceiling of

J-08 1- 1,000 feet or above.
2- 3,000 feet or above.
3- 4,000 feet or above.
4- 5,000 feet or above.

222. The operation of aircraft within Restricted Areas is

J-07 1- prohibited.

2- not entirely prohibited, but subject to limitations.

3- permitted with no restrictions.

4- permitted because there are no hazards involved.

223. Warning Areas are located within

J-07 1- international airspace.

2- the contiguous United States.

3- areas of intensive military jet training.

4- all areas of military artillery firing, aerial gunnery, or guided missiles.

224. A pilot of a VFR aircraft may request and receive Minimum Safe Altitude Warning (MSAW) service provided the aircraft is equipped with

J-10 1- an operating transponder with Mode C. capability.

2- An operating transponder with Mode A capability.

3- only a radio capable of two-way communications.

4- a VOR receiver and Distance Measuring Equipment.

225. Which of the following is correct relative to VFR radar advisory service?

J-10 1- It includes vectors away from conflicting traffic without pilot requests.

2- It does not include vectors away from conflicting traffic unless requested by the pilot.

3- It includes both vectors and altitude changes away from conflicting traffic without pilot requests.

4- It does not include vectors away from conflicting traffic, but does include altitude changes away from conflicting traffic.

226. After VFR Radar Traffic Information Service has been initiated, this service

J-10 1- must be continued by ATC until the flight terminates.

2- may be discontinued at the discretion of ATC.

3- may be discontinued by ATC, but if so should be questioned by the pilot.

4- must be continued by ATC unless the pilot states "Negative Radar Service."

227. The primary purpose of VFR Radar Traffic Information Service is to

J-10 1- provide adequate vertical separation between nontransponder equipped aircraft and the terrain or obstruction.

2- relieve participating pilots of the responsibility for continual vigilance to see and avoid other traffic.

3- alert participating pilots of the position of possible conflicting traffic.

4- provide heading and altitude information to enable VFR pilots to avoid clouds.

228. During normal VFR cruising flight at 9,500 feet MSL, unless otherwise advised by ATC, the transponder should be set to which code?

J-10 1- 0400.
2- 1200.
3- 1400.
4- 2200.

229. Radar-equipped FAA Air Traffic Control facilities can provide adequate radar assistance only to aircraft

J-10 1- within 50 NM of the radar site.

2- equipped for instrument flight and flown by an instrument-rated pilot.

3- identified by radar and capable of communicating with a radar facility.

4- equipped with at least a 64 code capability transponder.

230. If Air Traffic Control instructs a pilot to "squawk VFR" when departing a Terminal Radar Service Area, under Visual Flight Rules, the pilot should

J-10 1- set transponder code to 1400, but do not engage "ident" feature.

2- set transponder code to 1200, and engage "ident" feature.

3- set transponder code to 1400, and engage "ident" feature.

4- set transponder code to 1200, but do not engage "ident" feature.

231. When climbing or descending in VFR conditions between the surface and 12,500 feet MSL, unless otherwise advised by ATC, what transponder code should be used and how should the "ident" feature be used?

J-10 1- Code 1200, and the "ident" feature should be engaged.

2- Code 1200, and the "ident" feature should not be engaged.

3- Code 1400, and the "ident" feature should be engaged.

4- Code 1400, and the "ident" feature should not be engaged.

232. If prior to landing you desire to request ground transportation, the proper frequency to use would be one assigned to

J-12
1- UNICOM.
2- Approach Control.
3- Control Towers.
4- Flight Service Stations.

233. The primary purpose of Aeronautical Advisory Stations (UNICOM) is to provide information to pilots pertaining to

J-12
1- radar assistance to VFR aircraft.
2- Air Traffic Control.
3- runway and wind conditions.
4- takeoff and landing clearances.

234. The range of a transponder is reduced by

J-10
1- precipitation.
2- high altitude.
3- cumulus clouds.
4- low altitude.

235. The range of a transponder may be reduced by

J-10
1- high altitude.
2- precipitation.
3- aircraft antenna shielding.
4- cumulus clouds.

236. A pilot of a civil aircraft should not, under any circumstances, operate a transponder on code

J-10
1- 0000.
2- 1400.
3- 7600.
4- 7700.

237. Which of the following is true when operating a transponder?

J-10
1- Code 4000 should be used by civil aircraft unless otherwise advised by ATC.
2- "Standby" should not be used when changing codes.
3- "Ident" feature should be activated after each code change.
4- Code 7500 should be used in an emergency.

238. The recommended procedure to change from transponder code 2700 to code 7200 is first switch to code

J-10
1- 0000 then 7200.
2- 7500 then 7200.
3- 2200 then 7200.
4- 7700 then 7200.

239. To alert ATC of an emergency, the transponder should be adjusted to code

J-10
1- 1200.
2- 1400.
3- 7200.
4- 7700.

240. How should a transponder be adjusted if two-way radio communications failure occurs?

J-10
1- Code 7600 for 1 minute, then code 7700 for 10 minutes and repeat process.
2- Code 7700 for 1 minute, then code 7600 for 15 minutes and repeat process.
3- Code 7700 for 10 minutes, then code 7600 for 15 minutes and repeat process.
4- Code 7600 for 10 minutes, then code 7700 for 15 minutes and repeat process.

241. To "SQUAWK ALTITUDE" the pilot should set the transponder to

J-10
1- Code 7700 and report the aircraft's altitude immediately.
2- Mode C.
3- Mode A and "IDENT."
4- Code 7700 and "IDENT."

242. To "SQUAWK MAYDAY" the pilot should set the transponder to

J-10
1- Mode A code 7700.
2- Mode C code 7600.
3- Mode C code 7500.
4- Mode A code 7200.

243. Breathing carbon monoxide results in

J-19 1- increased muscular activity.
2- an increase in both muscular and mental activity.
3- reduced ability to reason and make decisions.
4- an increased sense of well-being.

244. Large accumulations of carbon monoxide in the body result in

J-19 1- feeling sluggish.
2- being too warm.
3- loss of muscular power.
4- tightness across the forehead.

245. The onset of carbon monoxide poisoning can be detected by

J-19 1- general weakness.
2- being too warm.
3- dimming of vision.
4- ringing in the ears.

246. Which physiological condition normally encountered during flight should a pilot be able to discount and overcome through practice and experience?

J-19 1- Vertigo.
2- Hypoxia.
3- Aerotitis.
4- Aerosinusitis.

247. Which statement concerning hypoxia is true?

J-19 1- Hypoxia is caused by nitrogen bubbles in the joints and bloodstream.
2- Forcing oneself to concentrate on the flight instruments will help to overcome the effects of hypoxia.
3- It is possible to predict exactly when and at what flight level hypoxia will occur, and how it will manifest itself.
4- Tingling or warm sensations and sweating may be symptoms of hypoxia.

248. Another cause of hypoxia other than reduced atmospheric pressure is

J-19 1- vertigo.
2- hyperventilation.
3- toxic substances in the blood.
4- high rates of descent.

249. If a VFR flight plan has been filed and not closed, a search will be started

J-16 1- 30 minutes after the ETA specified on the flight plan.
2- 60 minutes after the ETA specified on the flight plan.
3- 90 minutes after the ETA specified on the flight plan.
4- immediately after the ETA specified on the flight plan.

250. What is 1300 Pacific Standard Time when converted to Greenwich Mean Time?

J-16 1- 0500 GMT.
2- 0600 GMT.
3- 2000 GMT.
4- 2100 GMT.

251. What is 1500 Mountain Standard Time when converted to Greenwich Mean Time?

J-16 1- 0800 GMT.
2- 0900 GMT.
3- 2100 GMT.
4- 2200 GMT.

252. What is 1800 Central Standard Time converted to Greenwich Mean Time?

J-16 1- 1200 GMT.
2- 1300 GMT.
3- 2300 GMT.
4- 2400 GMT.

253. What is 2200 Eastern Standard Time when corrected to Greenwich Mean Time?

J-16 1- 0200 GMT.
2- 0300 GMT.
3- 1600 GMT.
4- 1700 GMT.

254. It is recommended, but not required, that a pilot file a VFR flight plan for a flight in

J-16 1- a Domestic Air Defense Identification Zone.
2- a Coastal Air Defense Identification Zone.
3- a Distant Early Warning Identification Zone.
4- VFR conditions.

AIRPORT OPERATIONS

HAND SIGNALS

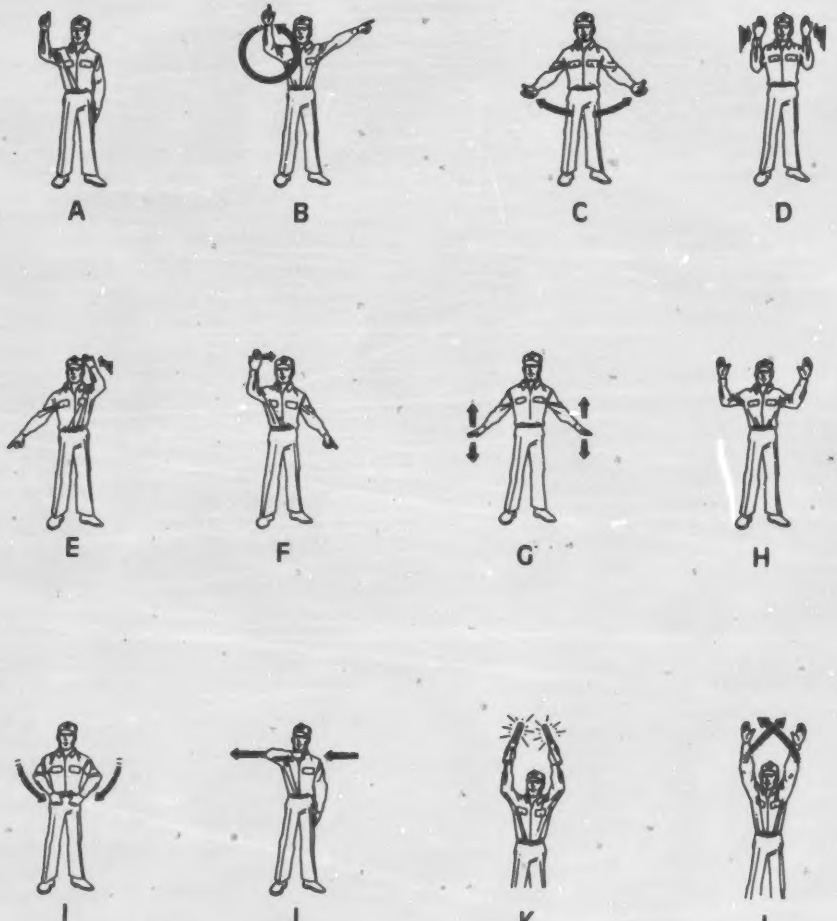

A
B
C
D
E
F
G
H
I
J
K
L

Figure 3

255. The hand signal depicted in illustration H, Figure 3, means

J-20
1- slow down.
2- come ahead.
3- stop.
4- all clear.

256. The hand signal depicted in illustration A, Figure 3, means

J-20
1- all clear.
2- right turn.
3- slow down.
4- start engine.

257. The hand signal depicted in illustration G, Figure 3, means

J-20
1- insert chocks.
2- slow down.
3- emergency stop.
4- pull chocks.

258. The hand signal depicted in illustration D, Figure 3, means

J-20
1- all clear.
2- slow down.
3- emergency stop.
4- come ahead.

259. The hand signal depicted in illustration I, Figure 3, means

J-20
1- emergency stop.
2- slow down.
3- pull chocks.
4- insert chocks.

260. The hand signal depicted in illustration L, Figure 3, means

J-20
1- emergency stop.
2- cut engine.
3- slow down.
4- all clear.

261. The hand signal depicted in illustration C, Figure 3, means

J-20
1- come ahead.
2- pull chocks.
3- cut engine.
4- insert chocks.

262. The shortage of oxygen in the human body results in a condition called

J-19
1- hypoxia.
2- hyperventilation.
3- aerotitis.
4- aerosinusitis.

263. Rapid or extra deep breathing while using oxygen can cause a condition known as

J-19
1- hypoxia.
2- hyperventilation.
3- aerotitis.
4- aerosinusitis.

264. Which statement concerning hypoxia is true?

J-19
1- The body has a built-in alarm system to warn of the onset of hypoxia.
2- Heavy smokers may experience symptoms of hypoxia at lower altitudes than nonsmokers.
3- Closing the eyes for a short time may help to overcome the effects of hypoxia.
4- It is possible to predict exactly when and at what flight level hypoxia will occur.

265. If exhaust odors are detected in the cockpit, the pilot should

J-19
1- shut down the engine and land immediately.
2- shut off the cabin heater, and close all openings to the engine compartment.
3- open all cabin vents including passages to the engine compartment.
4- avoid inhaling 100% oxygen.

266. Susceptibility to carbon monoxide poisoning increases as

J-19
1- air temperature decreases.
2- air humidity decreases.
3- altitude decreases.
4- altitude increases.

267. One of the early symptoms of carbon monoxide poisoning is a

J-19 1- feeling of sluggishness.
2- loss of vision.
3- loss of muscular power.
4- severe headache.

268. While operating in the traffic pattern of a controlled airport, pilots may adjust flight to achieve proper spacing without ATC approval by

J-20 1- executing shallow "S" turns.
2- climbing or descending at the pilot's discretion.
3- executing 180° turns with shallow banks.
4- executing 360° turns.

269. The reason altimeters should be adjusted to the same altimeter setting for a specific area is

J-20 1- the cancellation of altimeter error due to position of static source.
2- the elimination of a need to make in-flight calculations of true altitude.
3- more accurate terrain clearance in mountainous areas.
4- to provide better vertical separation of aircraft.

270. When in the vicinity of a VOR which is being used for navigation on VFR flights, it is important to

J-20 1- concentrate on the omni indicator and carefully make corrections so as to pass directly over the VOR.
2- exercise sustaining vigilance to avoid aircraft that may be converging on the VOR from other directions.
3- pass the VOR on the right side of the radial to allow room for aircraft flying in the opposite direction on the same radial.
4- attempt to locate the VOR visually to ensure that the VOR was actually passed when the TO-FROM indicator changed.

271. Which type of approach and landing is recommended during gusty wind conditions?

J-20 1- A power-off approach and power-off landing.
2- A power-on approach and power-on landing.
3- A power-off approach and power-on landing.
4- A power-on approach and power-off landing.

272. Pilots are encouraged to turn "on" the aircraft rotating beacon

J-20 1- just prior to takeoff.
2- just prior to taxi.
3- any time the engines are in operation.
4- only when the visibility is less than 5 miles.

273. When entering a turn, the primary function of the rudder is to

0-02 1- cause the airplane to turn.
2- control yawing about the vertical axis.
3- allow the airplane to pitch about its lateral axis.
4- prevent the airplane from rolling about the longitudinal axis.

274. The most important function of a rudder during coordinated flight is to

0-02 1- prevent skids.
2- make the airplane turn.
3- help overcome the effects of torque as well as the effects of adverse yaw.
4- overcome the yaw caused by the aileron rising as the wing is lowered.

275. Maneuvering the airplane is generally divided into four flight fundamentals which are

0-02 1- starting, taxiing, takeoff, and landing.
2- airplane power, pitch, bank, and trim.
3- takeoff, normal flight, slow flight, and stalls.
4- straight-and-level flight, turns, climbs, and descents.

276. The primary function of the rudder, while entering a turn from straight-and-level flight, is to

0-02
1- overcome the yaw caused by the lowered aileron on the higher wing.
2- overcome the yaw caused by the lowered aileron on the lower wing.
3- overcome the yaw caused by the raised aileron on the higher wing.
4- make the airplane turn.

277. To produce the desired effect, trim tabs must be adjusted

0-02
1- in such a direction as to remain flush with the primary control surfaces they affect.
2- in the same direction as the primary control surfaces they affect.
3- in the opposite direction to the primary control surfaces they affect.
4- depending upon the design of the trim tab controls.

278. What is the most important function of a rudder during coordinated flight?

0-02
1- The rudder prevents skids.
2- The rudder turns the airplane.
3- Properly applied, the rudder helps to overcome the effects of torque and adverse yaw.
4- Applying rudder overcomes the asymmetrical thrust of the propeller as a turn is initiated.

279. Air deflections produced by a rotating propeller cause dynamic pressure on the engine side of the propeller to be greater than atmospheric pressure, thus generating

0-03
1- torque.
2- horsepower.
3- drag.
4- thrust.

280. For a given airfoil the angle of attack which results in a stall

0-03
1- remains constant regardless of bank, load factor, or airspeed.
2- varies directly with the degree of bank.
3- is dependent on the load factor.
4- varies with the speed of airflow around the airfoil.

281. Aerodynamically, propeller thrust is the result of the

0-03
1- deflective forces on the curved side of the blade.
2- angle of incidence of the blade.
3- decreased pressure on the flat side of the blade and increased pressure on the curved side.
4- shape and angle of attack of the blade.

282. The point on an airfoil through which lift acts is the

0-03
1- midpoint of the chord.
2- center of pressure.
3- center of rotation.
4- center of gravity.

283. When the angle of attack of an asymmetrical airfoil is increased, the center of pressure will

0-03
1- remain unaffected.
2- move forward.
3- move aft.
4- move erratically.

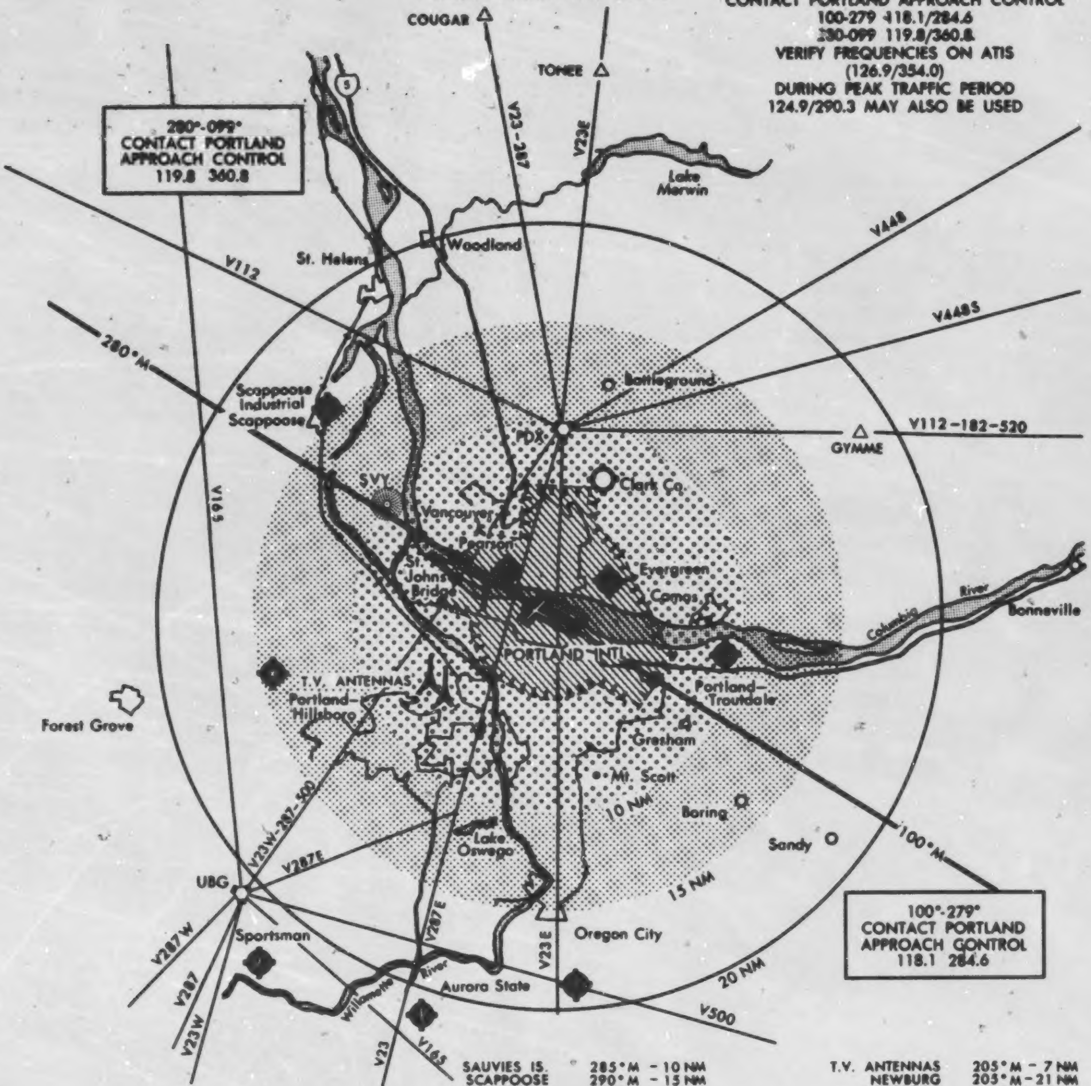
284. The angle between the chord line of an airfoil and the relative wind is known as the angle of

0-03
1- lift.
2- attack.
3- incidence.
4- longitudinal dihedral.

TRSA-60

TERMINAL RADAR SERVICE AREA
(NOT TO BE USED FOR NAVIGATION)

PORTLAND, OREGON
PORTLAND INTERNATIONAL AIRPORT
FIELD ELEV. 26' MSL



CONTACT PORTLAND APPROACH CONTROL
100-279 118.1/284.6
280-099 119.8/360.8
VERIFY FREQUENCIES ON ATIS
(126.9/354.0)
DURING PEAK TRAFFIC PERIOD
124.9/290.3 MAY ALSO BE USED

280°-099°
CONTACT PORTLAND
APPROACH CONTROL
119.8 360.8

100°-279°
CONTACT PORTLAND
APPROACH CONTROL
118.1 284.6

COUGAR
TONEE
V23-287
V23E
5
Lake Merwin
Woodland
St. Helens
V112
V448
V448S
280°M
Battleground
Scappoose Industrial
Scappoose
PDX
GYMME
V112-182-520
V165
SVY
Clark Co.
Vancouver
Pearson
St. Johns Bridge
Evergreen
Camas
Columbia
River
Bonneville
PORTLAND INTL
T.V. ANTENNAS
Portland-Hillsboro
Portland-Troutdale
Forest Grove
Gresham
Mt. Scott
10 NM
Boring
Sandy
100°M
V23W-287-500
Lake Oswego
V287E
UBG
15 NM
Oregon City
Sportsman
V287W
V287E
V23E
Willamette
River
Aurora State
20 NM
V500
V287
V23W
V23
V165

SAUVIES IS.	285°M - 10 NM
SCAPPOOSE	290°M - 15 NM
ST. HELENS	310°M - 18 NM
WOODLAND	322°M - 20 NM
COUGAR	332°M - 30 NM
TONEE	344°M - 28 NM
SCHOLLS	003°M - 7 NM
GYMME	037°M - 18 NM
BONNEVILLE	063°M - 28 NM
CAMAS	072°M - 9 NM
TROUTDALE	084°M - 9 NM
BATTLEGROUND	355°M - 12 NM
LAKE MERWIN	355°M - 24 NM

T.V. ANTENNAS	205°M - 7 NM
NEWBURG	205°M - 21 NM
HILLSBORO	235°M - 15 NM
FOREST GROVE	235°M - 22 NM
ST JOHNS BRIDGE	240°M - 7 NM
GRESHAM	108°M - 9 NM
SANDY	108°M - 19 NM
BORING	113°M - 14 NM
MT SCOTT	140°M - 9 NM
OREGON CITY	155°M - 15 NM
LAKE OSWEGO	175°M - 11 NM
AURORA	175°M - 22 NM

LEGEND

▨	SURFACE TO 8000' MSL WITHIN AIRPORT CONTROL ZONE
▩	2000 TO 8000' MSL
░	3000 TO 8000' MSL

Prepared by the National Ocean Survey
at the direction of the
FEDERAL AVIATION ADMINISTRATION

Figure 4

285. The purpose of a Terminal Radar Service Area such as depicted by Figure 4, is to

J-26
1- adjust the flow of VFR traffic into the traffic pattern.
2- provide limited vectoring to IFR and VFR aircraft operating within this area.
3- provide ATC separation between VFR aircraft and weather conditions that are below VFR minimums.
4- provide ATC separation between participating VFR aircraft and all IFR aircraft operating within this area.

286. ATC authorization for VFR flight into a Terminal Radar Service Area such as the one depicted by Figure 4, is

J-26
1- mandatory for flights landing at the primary airport (Portland Intl.) but not for flights through the area.
2- mandatory.
3- encouraged but not mandatory.
4- mandatory for arrivals but not departures.

287. Refer to Figure 4. If inbound to Portland Intl. Airport from the south along V23E, radio communication with Portland Approach Control should be made on frequency

J-26
1- 118.1 MHz.
2- 119.8 MHz.
3- 123.0 MHz.
4- 126.9 MHz.

288. Refer to Figure 4. If inbound to Portland Intl. Airport from the north along V23E, radio communication with Portland Approach should be made on frequency

J-26
1- 118.1 MHz.
2- 119.8 MHz.
3- 122.5 MHz.
4- 126.9 MHz.

289. Refer to Figure 4. The floor of the Terminal Radar Service Area over Portland-Hillsboro Airport (located west of Portland Intl. Airport) is

J-26
1- 2,000 feet MSL.
2- 2,000 feet AGL.
3- 3,000 feet MSL.
4- 3,000 feet AGL.

290. ATC radar service provided in a Terminal Radar Service Area such as depicted by Figure 4, is the same as that provided in a

J-26
1- Control Zone.
2- Stage III Service Area.
3- Stage II Service Area.
4- Stage I Service Area.

291. Refer to Figure 4. If inbound to the Portland Intl. Airport from the east, along the Columbia River, at an altitude of 4,500 feet MSL, the Terminal Radar Service Area would first be entered at a point

J-26
1- 5 NM from Portland Intl.
2- 10 NM from Portland Intl.
3- 15 NM from Portland Intl.
4- 20 NM from Portland Intl.

292. The maximum indicated airspeed for reciprocating engine aircraft within an Airport Traffic Area located within a Terminal Radar Service Area such as depicted by Figure 4, is

J-26
1- 156 knots.
2- 180 knots.
3- 200 knots.
4- 250 knots.

293. The maximum indicated airspeed for flight within a Terminal Radar Service Area such as depicted by Figure 4, and outside the Airport Traffic Area, is

J-26
1- 156 knots.
2- 180 knots.
3- 200 knots.
4- 250 knots.

294. The critical altitude of an aircraft engine is the maximum altitude at which

0-04 1- the engine rated horsepower is reduced to 75% of its sea level rated value.

2- a supercharger must be placed in high ratio to maintain sea level rated horsepower.

3- that engine will no longer create enough power for climb purposes.

4- that engine can develop its maximum continuous power.

295. Which statement generally describes the relationship of the forces acting on an airplane in a constant power and constant airspeed descent?

0-04 1- Total thrust is equal to total drag; total weight is greater than total lift.

2- Thrust is greater than drag; weight is greater than lift.

3- Total thrust is equal to total drag; total lift is equal to total weight.

4- Thrust is greater than drag; lift is equal to weight.

296. When considering the forces acting upon an airplane in straight-and-level flight at constant airspeed, which statement is correct?

0-04 1- Drag always acts rearward parallel to relative wind and is less than thrust.

2- Thrust always acts forward parallel to the relative wind and is greater than drag.

3- Lift always acts perpendicular to the longitudinal axis of the wing and is greater than weight.

4- Weight always acts vertically toward the center of the earth.

297. At a constant power setting the rate of climb of an airplane is greater when the wings are level than when in a climbing turn because when level the

0-04 1- relative airspeed is greater.

2- wing loading is greater.

3- center of lift is nearer the trailing edge of the wing.

4- vertical lift component is greater.

298. Assume an airplane is cruising at 100 MPH and is creating 1,000 pounds of drag. If the angle of attack remains the same but the airspeed is doubled, the total drag would be increased to

0-04 1- 4,000 pounds.
2- 3,000 pounds.
3- 2,000 pounds.
4- 1,000 pounds.

299. The acute angle between the chord of an airfoil (wing) and its direction of motion relative to the air is known as the

0-03 1- dihedral angle.
2- stalling angle.
3- angle of attack.
4- angle of incidence.

300. Aspect ratio of the wing is defined as the ratio of the

0-03 1- wingspan to the wing root.

2- square of the chord to the wingspan.

3- wingspan to the mean aerodynamic chord.

4- wing spar to the main compression rib.

301. The lift produced by an airfoil is the force produced

0-03 1- half way between the chordline and the relative wind.

2- opposite to the relative wind.

3- parallel to the relative wind.

4- perpendicular to the relative wind.

302. The angle between the chord line of the wing and the longitudinal axis of the airplane is known as the angle of

0-03 1- dihedral.
2- incidence.
3- attack.
4- relative wind.

303. The three axes of an airplane intersect at the

0-05
1- midpoint of the mean chord.
2- center of gravity.
3- center of pressure.
4- midpoint of the datum line.

304. During flight, if a change is made in pitch attitude, an airplane will rotate about its

0-05
1- center of pressure.
2- center of lift.
3- chord midpoint.
4- center of gravity.

305. Rotation about the longitudinal axis is known as

0-05
1- yawing, and is controlled with the rudder.
2- yawing, and is controlled with the ailerons.
3- rolling, and is controlled with the ailerons.
4- pitching, and is controlled with the elevator.

306. Rotation about the lateral axis is known as

0-05
1- yawing, and is controlled with the rudder.
2- yawing, and is controlled with the ailerons.
3- rolling, and is controlled with the ailerons.
4- pitching, and is controlled with the elevator.

307. The reason a light general aviation airplane tends to nose down during power reductions is that the

0-04
1- thrust line acts horizontally and above the force of drag.
2- center of gravity is located forward of the center of pressure.
3- center of pressure is located forward of the center of gravity.
4- force of drag acts horizontally and above the thrust line.

308. What changes in airplane control must be made to maintain altitude while the airspeed is being decreased?

0-04
1- Increase the angle of attack to compensate for the decreasing lift.
2- Maintain a constant angle of attack until the desired airspeed is reached, then increase the angle of attack.
3- Increase angle of attack to produce more lift than weight.
4- Decrease the angle of attack to compensate for the increase in drag.

309. Lift on a wing is most properly defined as the

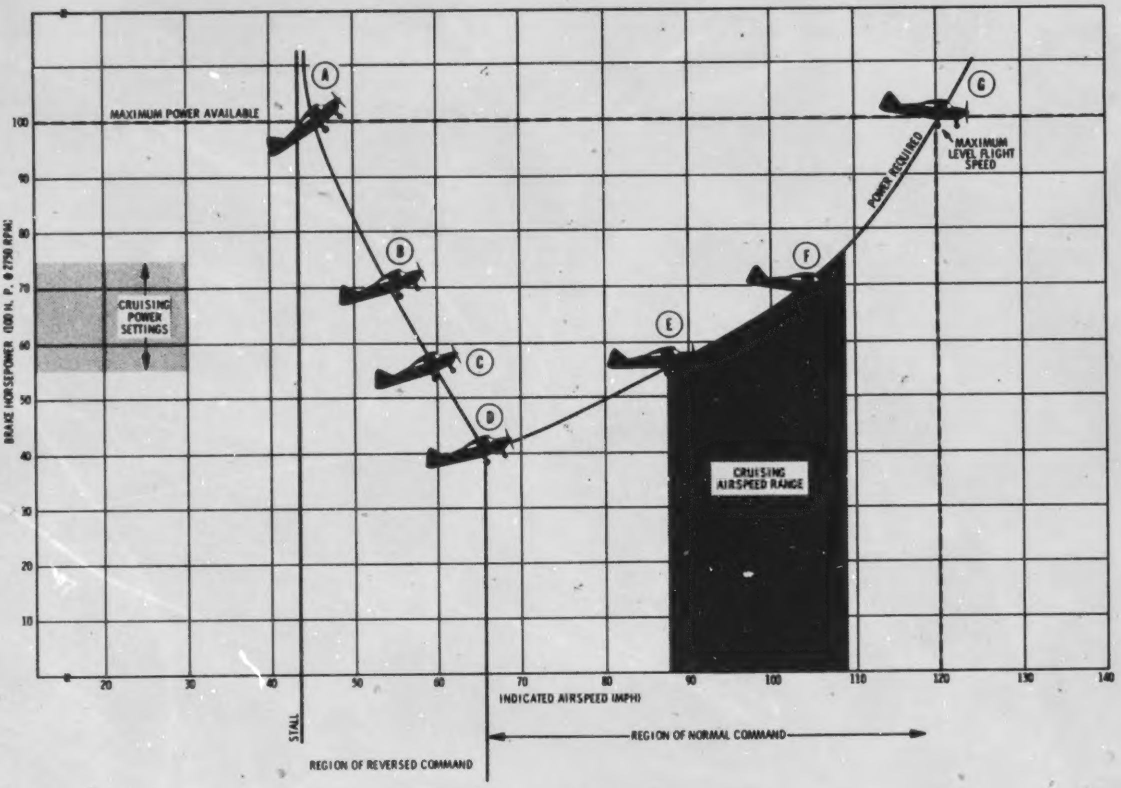
0-04
1- force produced perpendicular to the longitudinal axis.
2- reduced pressure resulting from a smooth flow of air over a curved surface and acting perpendicular to the mean surface.
3- force produced perpendicular to the relative wind.
4- differential pressure acting perpendicular to the chord of the wing.

310. Which statement best describes the relationship of the forces acting on an airplane when it is climbing at constant airspeed and constant rate?

0-04
1- Lift is equal to weight, and thrust is equal to drag.
2- Lift is equal to weight, and thrust is greater than drag.
3- Lift is greater than weight, and thrust is greater than drag.
4- Lift is greater than weight, and thrust is equal to drag.

311. Which statement generally describes the relationship of the forces acting on an airplane that is climbing at a constant airspeed and at constant power?

0-04
1- Thrust is greater than drag, and lift is greater than weight.
2- Total thrust is equal to total drag, and total lift is greater than total weight.
3- Thrust is greater than drag, and lift is equal to weight.
4- Total thrust is equal to total drag, and total lift is equal to total weight.



A LIGHT AIRPLANE IN A CLEAN CONFIGURATION AT SEA LEVEL

Figure 5

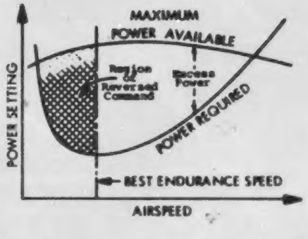


Figure 5a

312. Refer to Figure 5. Which airplane illustrated would require the least power to maintain altitude?

0-10
1- B.
2- C.
3- D.
4- G.

313. Refer to Figure 5. Which of the following airplanes illustrated would require the least power to maintain altitude?

0-10
1- A.
2- B.
3- C.
4- G.

314. Refer to Figure 5. Which of the following airplanes illustrated would require the most power to maintain altitude?

0-10
1- A.
2- B.
3- C.
4- F.

315. Refer to Figure 5. Which airplane illustrated is flying at the speed for maximum endurance?

0-10
1- A.
2- B.
3- D.
4- G.

316. Refer to Figure 5. In regard to the amount of power necessary to maintain level flight at speeds below the lowest point on the power curve, it requires

0-10
1- increased power as speed is decreased.
2- decreased power as speed is decreased.
3- increased power as speed is increased.
4- no change in power as the speed is increased or decreased.

317. Refer to Figure 5a. The power available line (assume a fixed-pitch propeller) is curved because propeller efficiency

0-10
1- remains the same as airspeed is changed.
2- remains the same as pitch attitude is changed.
3- changes at different airspeeds and pitch attitudes.
4- changes only at different airspeeds.

318. Refer to Figure 5. Which of the following best describes flight in the region of normal command while maintaining a constant altitude?

0-10
1- A lower airspeed requires a lower power setting.
2- A higher airspeed requires a lower power setting.
3- A lower airspeed requires a higher power setting.
4- A change in airspeed requires no change in power.

319. Refer to Figure 5. Which of the following best describes flight in the region of reversed command while maintaining a constant altitude?

0-10
1- A higher airspeed requires a higher power setting.
2- A lower airspeed requires a lower power setting.
3- A higher airspeed requires a lower power setting.
4- A change in airspeed requires no change in power.

320. The phenomenon of ground effect causes

0-14
1- the angle of attack to increase, thus increasing the stall speed.
2- induced drag to increase, thus reducing the groundspeed.
3- the direction of the relative wind to change, thus producing a smaller angle of attack.
4- the wing to become less efficient, thus requiring a longer ground run for takeoff.

321. Pilots operating at less than one wingspan length above the surface, such as on takeoff or just before touchdown during landing, can expect

0-14
1- the necessity for additional up elevator pressure to counteract nose heaviness.
2- an overall increase in parasite and induced drag.
3- high induced drag at low airspeed.
4- a decrease in longitudinal stability.

322. Even under conditions of high gross weight, high density altitude, and high temperature, it is possible for an airplane to become airborne at a speed below the normal stall speed. This is because of

0-14
1- the phenomenon of ground effect.
2- an increase in downwash plus the decrease in upwash.
3- an increase in downwash.
4- an increase in upwash.

323. Maximum range in a propeller driven airplane is achieved in a flight condition which produces the greatest proportion between

0-10
1- fuel flow and power required.
2- flight hours and power available.
3- speed and power required.
4- flight hours and fuel flow.

324. A constant rate of climb in an airplane is determined by

0-10
1- windspeed.
2- the airplane weight.
3- excess engine power.
4- excess airspeed.

325. Frost covering the upper surface of an airplane wing will usually cause

0-09
1- the airplane to stall at an angle of attack that is lower than normal.
2- no problems for pilots of light aircraft.
3- drag factors so large that sufficient speed cannot be obtained for takeoff.
4- the airplane to stall at an angle of attack that is higher than normal.

326. How is an airplane's performance affected by frost on the wings?

0-09
1- Lift is decreased; drag is decreased.
2- Lift is increased; drag is decreased.
3- Lift is decreased; drag is increased.
4- Lift is increased; drag is increased.

327. If the airspeed of an airplane is doubled while the angle of attack is held constant, the parasite drag will

0-09
1- remain the same.
2- be four times greater.
3- double.
4- decrease as the airspeed increases.

328. An accumulation of frost on the airplane wings will result in

0-09
1- a decrease in lift and drag.
2- an increase in lift and a decrease in drag.
3- a decrease in lift and an increase in drag.
4- an increase in lift and drag.

329. Both lift and drag of an airfoil are

0-06
1- proportional to the square of the velocity (V^2) of the relative wind.
2- proportional to increases and decreases in the velocity of the relative wind.
3- inversely proportional to the air density.
4- inversely proportional to the area of the wing.

330. During a change in bank, an airplane will rotate around its center of

0-05
1- gravity and longitudinal axis.
2- pressure and lateral axis.
3- gravity and lateral axis.
4- pressure and longitudinal axis.

331. During a change in pitch attitude, an airplane will rotate around its center of

0-05
1- gravity and longitudinal axis.
2- pressure and lateral axis.
3- gravity and lateral axis.
4- pressure and longitudinal axis.

332. The additional load imposed on the wings of an airplane during a level coordinated turn in smooth air is dependent on the

0-17
1- angle of bank.
2- true airspeed.
3- density altitude.
4- rate of turn.

333. In a constant altitude coordinated turn, the load factor imposed on an airplane is the result of

0-17
1- wind and density altitude.
2- rate of turn and airspeed.
3- angle of attack and airspeed.
4- centrifugal force and gravity.

334. What is one reason for avoiding operations at or above red line speeds?

0-17
1- Control effectiveness is so greatly impaired that it renders the airplane uncontrollable.
2- The stalling speed is increased to the point that maneuvers cannot be performed without resulting in a stall.
3- The lifting capacity of the wing is so great that the load factor can easily be exceeded.
4- Excessive induced drag will cause possible structural failures.

335. For a given angle of bank, the load factor imposed on both the airplane and pilot in a coordinated constant-altitude turn

0-17
1- varies with the rate of turn.
2- increases at a very slow rate beyond 45° of bank.
3- is directly related to the airplane's gross weight.
4- is constant.

336. Why is it unwise to operate an airplane in excess of the maximum certificated gross weight?

0-17
1- Certain structural limitations may be exceeded.
2- An overloaded airplane is excessively stable in flight.
3- Flight in excess of certificated weights is not possible.
4- Fuel consumption may be significantly increased.

337. Operations approaching maximum speeds, such as Vne, should be avoided because

0-17
1- of the possibility of inducing flutter or exceeding the design load factors.
2- control effectiveness is so greatly impaired that it renders the airplane uncontrollable.
3- the stalling speed is increased to the point that maneuvers cannot be performed without resulting in a stall.
4- excessive induced drag will cause structural failures.

338. It is unwise to operate an airplane in excess of its maximum certificated gross weight primarily because

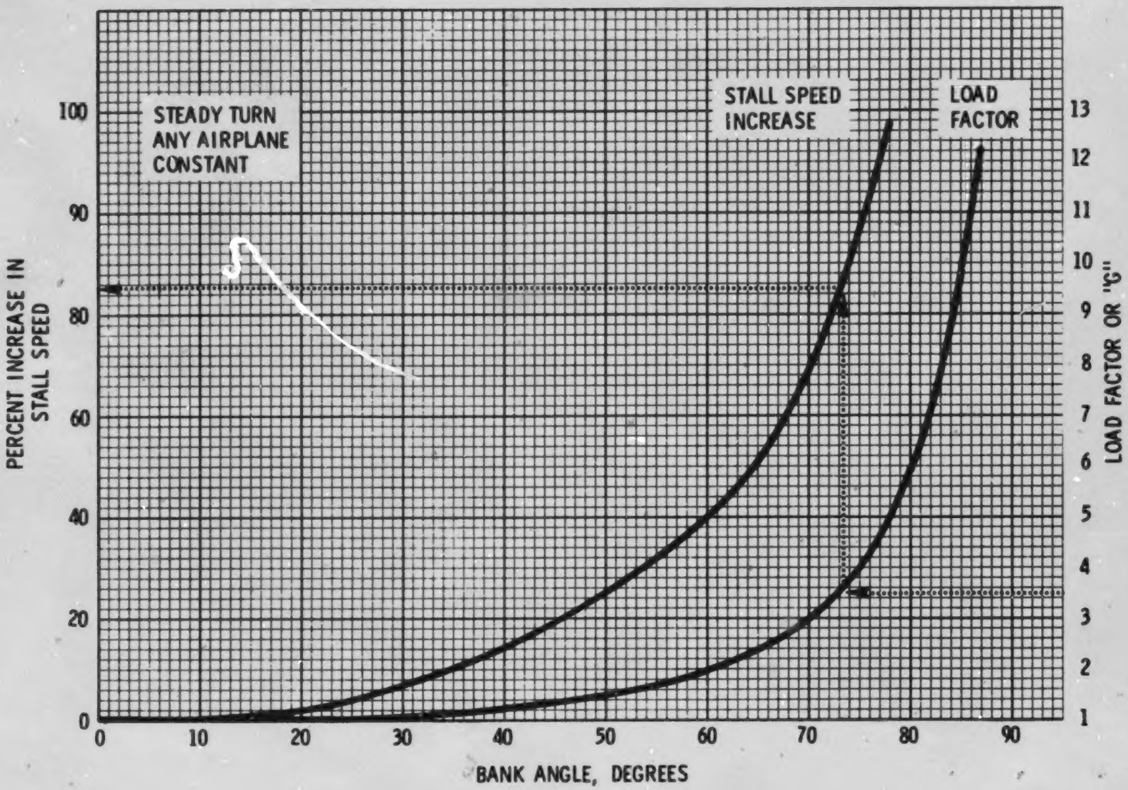
0-17
1- flight at weights in excess of maximum gross weights is not possible.
2- of the significant increase it will cause in fuel consumption.
3- excessive loads may be imposed upon some part of the structure.
4- an overloaded airplane is excessively stable in flight.

339. The phenomenon of "ground effect" is most likely to be involved in which of the following situations?

0-14
1- Inability to become airborne even though the airspeed is sufficient for a normal takeoff.
2- Inability to climb once airborne.
3- Abruptly settling back to the surface immediately after becoming airborne.
4- The absence of normal cushioning on landings in high-wing airplanes.

340. An airplane can become airborne at less than the normal takeoff speed. This is probably because of

0-14
1- ground effect.
2- a strong headwind.
3- an error in the airspeed indicator.
4- excessive power applied to the engine.


STEADY TURN
ANY AIRPLANE
CONSTANT
STALL SPEED
INCREASE
LOAD
FACTOR
PERCENT INCREASE IN STALL SPEED
LOAD FACTOR OR "G"
BANK ANGLE, DEGREES
0
10
20
30
40
50
60
70
80
90
100
1
2
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6
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10
11
12
13

Figure 6

341. Refer to Figure 6. What percent would the stall speed increase if the angle of bank is increased from 35° to 60°?

Q-08
1- 10%.
2- 20%.
3- 30%.
4- 40%.

342. Refer to Figure 6. What percent would the stall speed increase if the angle of bank is increased from 45° to 55°?

Q-08
1- 5%.
2- 12%.
3- 34%.
4- 42%.

343. Refer to Figure 6. What is the stall speed of an airplane under a load factor of 2 if the unaccelerated stall speed is 60 knots?

0-17
1- 66 knots.
2- 74 knots.
3- 84 knots.
4- 102 knots.

344. Refer to Figure 6. What is the stall speed of an airplane under a load factor of 4 if the unaccelerated stall speed is 70 knots?

0-17
1- 91 knots.
2- 116 knots.
3- 132 knots.
4- 140 knots.

345. Refer to Figure 6. What is the stall speed of an airplane under a load factor of 2 if its unaccelerated stall speed is 80 knots?

0-17
1- 90 knots.
2- 112 knots.
3- 120 knots.
4- 160 knots.

346. Refer to Figure 6. What is the stall speed of an airplane under a load factor of 3 if its unaccelerated stall speed is 60 knots?

0-17
1- 72 knots.
2- 84 knots.
3- 96 knots.
4- 102 knots.

347. Refer to Figure 6. What increase in load factor would take place if the angle of bank were increased from 60° to 70°?

0-17
1- 0.5 G.
2- 1.0 G.
3- 1.5 G's.
4- 2.0 G's.

348. Refer to Figure 6. What increase in load factor would take place if the angle of bank were increased from 60° to 80°?

0-17
1- 1 G.
2- 2 G's.
3- 3 G's.
4- 4 G's.

349. If the angle of bank were held constant and airspeed varied, the load factor would

0-17
1- vary depending on the rate of turn.
2- increase when speed increases.
3- decrease when speed decreases.
4- remain constant.

350. If, while holding the angle of bank constant, the rate of turn is varied the load factor would

0-17
1- remain constant.
2- vary depending upon speed.
3- vary depending upon weight.
4- increase if speed were increased.

351. Indicated stall speed is affected by

0-19
1- angle of attack, weight, and air density.
2- weight, load factor, and power.
3- weight, density altitude, power, and turbulence.
4- load factor, angle of attack, and power.

352. Why can turbulent air cause an increase in stalling speed?

0-19
1- The true airspeed is abruptly increased.
2- The load factor is suddenly decreased.
3- The angle of attack is decreased.
4- The angle of attack is increased.

353. As a general rule, airplanes tend to become more stable with

0-18 1- aft loading.
2- flaps extended.
3- light loads.
4- forward loading.

354. The tendency of an airplane to develop forces that further remove the airplane from its original position, when disturbed from a condition of steady flight, is known as

0-18 1- positive static stability.
2- static instability.
3- dynamic instability.
4- neutral static stability.

355. The tendency of an airplane to develop forces which restore it to its original condition, when disturbed from a condition of steady flight, is known as

0-18 1- controllability.
2- maneuverability.
3- stability.
4- balance.

356. Which is the best technique for minimizing the wing load factor when flying in severe turbulence?

0-17 1- Control airspeed as closely as possible with elevator and power, and accept variations of bank and altitude.

2- Set power and trim to obtain an airspeed at or below maneuvering speed, maintain wings level, and accept variations of airspeed and altitude.

3- Control airspeed with power, maintain wings level, and accept variations of altitude.

4- Control altitude with power, airspeed with elevator, and accept variations of bank.

357. The degree of airplane wing loading during a level coordinated turn in smooth air depends upon the

0-17 1- true airspeed.
2- angle of bank.
3- rate of turn.
4- density altitude.

358. The ratio between the total air load imposed on the wing and the gross weight in flight is known as the

0-17 1- power loading.
2- load factor.
3- yield load.
4- aspect ratio.

359. Load factor is the actual weight supported by the wings at any given moment

0-17 1- divided by the total weight of the airplane.

2- multiplied by the total weight of the airplane.

3- added to the total weight of the airplane.

4- subtracted from the total weight of the airplane.

360. Wing loading of an airplane is determined by a value which is the

0-17 1- gross weight of the airplane divided by the wing area.

2- total load the wing will carry.

3- ratio of the wing area to the horsepower.

4- gross weight divided by the span.

361. Assume that an airplane is certificated with a maximum gross weight of 2,500 lbs. and a load factor of 3.8. If this airplane were loaded to a gross weight of 2,650 lbs. and flown in turbulence creating a 3.8 load factor, what airload would be imposed upon its structure?

0-17 1- 2,650 lbs. and this airplane should not be flown at this gross weight.

2- 570 lbs. above maximum permissible, and this airplane should not be flown at this gross weight.

3- 150 lbs. above maximum permissible, and this airplane should not be flown at this gross weight.

4- 1,280 lbs. above maximum permissible and this airplane should not be flown at this gross weight.

362. The maximum allowable airspeed with flaps extended is lower than cruising speed because

0-20 1- they are used only when preparing to land.
2- the additional lift and drag created would overload the wing structure at higher speeds.
3- the flaps will retract automatically at higher speeds.
4- too much drag is induced.

363. Why is the maximum allowable airspeed with flaps extended (Vfe) lower than cruising airspeed?

0-20 1- They are used only when preparing to land.
2- The additional lift and drag created would overload the wing structure at higher speeds.
3- The flaps will retract automatically at higher speeds.
4- Too much drag is induced.

364. Which statement is true regarding the use of flaps during turns?

0-20 1- The addition of flaps decreases the stall speed.
2- The addition of flaps increases the stall speed.
3- In any given degree of bank, the addition of flaps has no effect on stall speed.
4- Using a constant flap setting and varying the bank has no effect on stall speed.

365. The use of flaps will produce

0-20 1- increased lift and decreased drag.
2- increased lift and increased drag.
3- decreased lift and increased drag.
4- decreased lift and decreased drag.

366. In a certificated airplane, uncontrollable spins are most likely to develop from normal spins if the

0-19 1- rudders and ailerons are cross controlled.
2- gross weight is exceeded.
3- most rearward CG position is exceeded.
4- minimum allowable load is exceeded.

367. For a given airfoil, the angle of attack which results in a stall

0-19 1- remains constant regardless of bank, load factor, or airspeed.
2- varies directly with the degree of bank.
3- is dependent on the load factor.
4- varies with the speed of airflow around the airfoil.

368. The angle of attack at which an airplane wing stalls will

0-19 1- change with an increase in gross weight.
2- remain the same regardless of gross weight.
3- decrease if the center of gravity is moved aft.
4- increase if the center of gravity is moved forward.

369. An airplane in a steep-banked turn stalls at a higher airspeed than it does with the wings level, because the

0-19 1- critical angle of attack has decreased.
2- critical angle of attack is reached at a higher airspeed.
3- total lift has decreased.
4- total drag has decreased.

370. Turbulent air can cause an increase in stalling speed when there is

0-19 1- a decrease in angle of attack.
2- a sudden decrease in load factor.
3- an abrupt increase in true airspeed.
4- an abrupt change in relative wind.

70

371. If cruising into a 15 MPH headwind and a 180° turn is made so the wind is from directly behind the airplane, the indicated airspeed would

0-22 1- be the same and the groundspeed would increase 30 MPH.

2- be the same and the groundspeed would increase 15 MPH.

3- decrease 15 MPH and the groundspeed would increase 15 MPH.

4- increase 30 MPH and the groundspeed would remain the same.

372. Assume an airplane is in cruising flight with a 25 MPH tailwind. If a 180° turn is made which places the wind directly on the nose of the airplane, the indicated airspeed would

0-22 1- decrease 50 MPH and the groundspeed would remain the same.

2- be the same and the groundspeed would decrease 50 MPH.

3- decrease 25 MPH and the groundspeed would decrease 25 MPH.

4- increase 25 MPH and the groundspeed would decrease 25 MPH.

373. An asymmetrical airfoil with zero angle of attack, creates a pressure below the wing that generally would be

0-21 1- less than atmospheric pressure.

2- equal to atmospheric pressure.

3- greater than atmospheric pressure.

4- less than the pressure along the upper surface of the wing.

374. During flight with zero angle of attack, the pressure along the upper surface of the wing would be

0-21 1- less than atmospheric pressure.

2- equal to atmospheric pressure.

3- greater than atmospheric pressure.

4- greater than the pressure below the wing.

375. Which statement is true relative to changing angle of attack?

0-21 1- An increase in angle of attack will increase impact pressure below the wing, and decrease drag.

2- An increase in angle of attack will increase impact pressure below the wing, and increase drag.

3- An increase in angle of attack will decrease impact pressure below the wing, and increase drag.

4- A decrease in angle of attack will increase impact pressure below the wing, and decrease drag.

376. The primary function of flaps is to

0-20 1- provide a steeper gliding angle.

2- increase control effectiveness at slow speeds.

3- permit a safer takeoff over high obstructions.

4- increase lateral stability.

377. Lowering the flaps during a landing approach

0-20 1- increases the angle of descent without increasing airspeed.

2- decreases the angle of descent without increasing power.

3- eliminates floating.

4- permits approaches at a higher indicated airspeed.

378. Which statement is true regarding airspeed control, degree of bank, and use of flaps during slow speed, low altitude maneuvering?

0-20 1- The airspeed should be constant during an increase in bank, regardless of flap setting.

2- The airspeed should be constant, regardless of the degree of bank or flap setting.

3- The airspeed should be increased if the bank is steepened and flaps are lowered.

4- The airspeed should be increased if the bank is steepened and flaps are retracted.

379. In standard atmosphere at sea level, an engine developing full power produces a manifold pressure (MP) of 27" Hg and 2600 RPM. What approximate MP and RPM should this engine produce in a standard atmosphere at 4,000 feet MSL under full power?

P-02
1- 23" Hg and 2600 RPM.
2- 25" Hg and 2600 RPM.
3- 27" Hg and 2200 RPM.
4- 31" Hg and 3000 RPM.

380. If, under standard atmospheric conditions at sea level, an engine using full power produces a manifold pressure of 29" Hg and 2700 RPM, what manifold pressure and RPM should this engine be expected to produce at 3,000 feet MSL using full power under standard atmospheric conditions?

P-02
1- 21" Hg and 2400 RPM.
2- 26" Hg and 2700 RPM.
3- 29" Hg and 2400 RPM.
4- 32" Hg and 3000 RPM.

381. Assume that prior to starting an engine the manifold pressure gauge indicates 29" Hg. The reason for this is that the

P-02
1- pressure in the manifold is the same as atmospheric pressure.
2- throttle is closed, trapping high pressure in the manifold.
3- throttle is in the full open position.
4- gauge is stuck at the full power position.

382. A clogged oil breather line on a reciprocating engine will cause

P-02
1- excessive oil consumption.
2- fuel starvation.
3- a low cylinder head temperature.
4- a lean mixture.

383. To properly purge water from the fuel system of an airplane equipped with fuel tank sumps and a fuel strainer quick drain, it is necessary to drain fuel from the

P-01
1- lowest point in the fuel system only.
2- fuel strainer drain and the fuel tank sumps.
3- fuel tank sump drains only.
4- fuel strainer drain only.

384. One of the disadvantages of fuel injector systems compared with carburetor systems is

P-01
1- uneven fuel distribution to the cylinders.
2- slower throttle response.
3- poor control of fuel/air mixture.
4- problems associated with restarting an engine that quits because of fuel starvation.

385. One of the disadvantages of fuel injection systems compared with carburetor systems is

P-01
1- difficulty in starting a hot engine.
2- uneven fuel distribution to the cylinders.
3- slower throttle response.
4- poor control of fuel/air mixture.

386. One advantage of fuel injection systems over carburetor systems is

P-01
1- easier starts when the engine is hot.
2- faster throttle response.
3- easier in-flight restarting should it become necessary.
4- less difficulty with vapor locks during ground operations.

387. One of the disadvantages of fuel injection systems compared with carburetor systems is

P-01
1- uneven fuel distribution to the cylinders.
2- slower throttle response.
3- poor control of fuel/air mixture.
4- vapor locks during ground operations on hot days.

388. One advantage of fuel injection systems over carburetor systems is

P-01 1- easier cold weather starts.

2- easier in-flight restarting should it become necessary.

3- less difficulty with vapor locks during ground operations.

4- easier starts when the engine is hot.

389. Fuel/air ratio is the ratio between the

P-01 1- weight of fuel and weight of air entering the carburetor.

2- weight of fuel and weight of air entering the cylinder.

3- volume of fuel and volume of air entering the carburetor.

4- volume of fuel and volume of air entering the cylinder.

390. One of the advantages of fuel injection systems over carburetor systems is

P-01 1- less difficulty in starting a hot engine.

2- easier restarting of an engine that quits because of fuel starvation.

3- a reduction in the probability of evaporative icing.

4- elimination of vapor locks during ground operations.

391. One advantage of fuel injection systems over carburetor systems is

P-01 1- better fuel distribution to the cylinders.

2- less difficulty with hot weather vapor locks during ground operations.

3- easier hot-engine starting.

4- easier in-flight restarting.

392. "P factor," the force which produces a yawing effect on takeoffs, climbs at slow airspeeds, and certain other attitudes, is the result of the

0-23 1- spiral characteristic of the air forced rearward by the rotating propeller.

2- gyroscopic force applied to the rotating propeller blades acting 90° in advance of the point force was applied.

3- propeller blade descending on the right producing more thrust than the ascending blade on the left.

4- clockwise rotation of the engine and propeller turning the airplane counterclockwise.

393. Which statement is true relating to the use of the rudder in conventional airplanes to compensate for the effects of torque?

0-23 1- If airspeed is decreased (power constant), right rudder pressure must be added.

2- If power is reduced (airspeed constant), right rudder pressure must be added.

3- If airspeed is increased (power constant), right rudder pressure must be added.

4- If power is increased (airspeed constant), left rudder pressure must be added.

394. Assume that after takeoff a turn is made to a downwind heading. In regard to the ground, the airplane will climb at

0-22 1- a greater rate into the wind than downwind.

2- a steeper angle downwind than into the wind.

3- the same angle upwind or downwind.

4- a steeper angle into the wind than downwind.

395. A downwind turn near the ground may be hazardous because

0-22 1- during the turn the airspeed is reduced by the speed of the wind and if the wind is strong enough will reduce the airspeed to the stalling point.

2- altitude is always lost in a turn.

3- the nose drops in a turn.

4- there may be insufficient space to maneuver in event of engine failure.

396. What pilot action should be taken when using fuel with a higher lead content than that recommended?

P-05
1- Avoid manifold pressures in excess of 25" Hg.
2- Avoid extremely lean mixture operation.
3- Operate the engine with a leaner than normal mixture.
4- Operate the engine with an RPM that is lower than the manifold pressure.

397. Failure to lean the mixture after leveling off at altitude will

P-04
1- reduce the fuel/air ratio in the carburetor.
2- allow the same fuel flow as at lower altitudes.
3- cause higher cylinder head temperature.
4- permit the same weight of air to enter the carburetor.

398. When leaning supercharged engines equipped with either a cylinder head temperature or exhaust gas temperature gauge, the mixture

P-04
1- can be leaned beyond the peak temperature because the enigne will be cooled from excess fuel.
2- should be leaned to the peak temperature and then richened for best economy and operating temperature.
3- can be leaned beyond the peak temperature and the engine will run cooler.
4- should never be leaned beyond the peak temperature.

399. The "Best Power Mixture" is that fuel/air ratio at which

P-04
1- a given power can be obtained with the highest manifold pressure or throttle setting.
2- cylinder head temperatures are the coolest.
3- climbs or descents can be made without adjusting the mixture control.
4- the most power can be obtained for any given throttle setting.

400. The mixture control is used to reduce the amount of

P-04
1- fuel flow in fuel injection engines only.
2- fuel flow in both fuel injection and carburetor equipped engines.
3- airflow in carburetor equipped engines only.
4- airflow in both fuel injection and carburetor equipped engines.

401. In less dense air a leaner mixture will

P-04
1- decrease fuel consumption, and decrease power output.
2- increase fuel consumption, and decrease power output.
3- decrease fuel consumption, and provide optimum power.
4- increase fuel consumption, and provide optimum power.

402. During takeoff, when maximum power and thrust are required, the constant-speed propeller should be set to a propeller blade angle which

P-04
1- will produce a low slipstream velocity.
2- will produce a small angle of attack with respect to its relative wind.
3- is high and will produce a low RPM.
4- will produce a large angle of attack with respect to its relative wind.

403. When operating an airplane with a constant-speed propeller, which procedure places the least stress on cylinder components?

P-04 1- Whether power settings are being increased or decreased, RPM is adjusted before manifold pressure.

2- When power settings are being increased, increase manifold pressure before RPM.

3- When power settings are being decreased, reduce manifold pressure before RPM.

4- When power settings are being decreased, reduce RPM before manifold pressure.

404. The main purpose of the mixture control is to

P-04 1- adjust the fuel flow to obtain the proper air/fuel ratio.

2- decrease the air supplied to the engine.

3- increase the oxygen supplied to the engine.

4- decrease oxygen supplied to the engine.

405. When establishing a climb, the proper sequence of engine control adjustment is to increase

P-04 1- mixture, followed by RPM and then manifold pressure.

2- manifold pressure and mixture but not the RPM.

3- manifold pressure followed by RPM, then mixture.

4- RPM, mixture, and then manifold pressure.

406. To establish a climb after takeoff in an airplane equipped with a constant-speed propeller, the output of the engine is reduced to climb power by decreasing manifold pressure and

P-04 1- increasing RPM by decreasing propeller blade angle.

2- decreasing RPM by decreasing propeller blade angle.

3- increasing RPM by increasing propeller blade angle.

4- decreasing RPM by increasing propeller blade angle.

407. Unless adjusted, the fuel/air mixture becomes richer with an increase in altitude because the amount of fuel

P-04 1- remains constant while the weight of air decreases.

2- remains constant while the volume of air decreases.

3- increases while the volume of air decreases.

4- increases while the volume of air remains constant.

408. If fuel/air mixture adjustments are not made during operation at high altitudes, engine performance will be affected because of

P-04 1- an increase in the amount of fuel and a decrease in the volume of air entering the carburetor.

2- a decrease in the weight of air while approximately the same amount of fuel enters the carburetor.

3- a decrease in the amount of fuel and a decrease in the volume of air entering the carburetor.

4- a constant volume of air and an increase in the amount of fuel metered by the carburetor.

409. Which statement is true regarding preheating an airplane during cold weather operations?

P-03 1- The cockpit, as well as the engine, should be preheated.

2- The possibility of fire is rare during preheating.

3- The cockpit area should not be preheated with portable heaters.

4- Hot air should be blown directly at the engine through the air intakes.

410. During preflight in cold weather, crankcase breather lines should receive special attention because they are susceptible to being clogged by

P-03 1- moisture from the outside air which has frozen.

2- congealed oil from the crankcase.

3- ice in the breather line.

4- sediment in the crankcase.

411. When operating an airplane equipped with a constant-speed propeller, and while maintaining a constant manifold pressure, the tendency of the engine to detonate will

P-08 1- decrease, with an increase in the temperature of the fuel/air mixture.

2- increase, with a decrease in RPM.

3- increase as the mixture is enriched.

4- decrease, with a decrease in RPM.

412. Which statement is true regarding the operation of a typical unsupercharged aircraft engine?

P-08 1- In general, rich mixtures must be used with caution when operating at high power settings.

2- Detonation often cannot be recognized from the cockpit through sound or engine roughness.

3- Most unsupercharged engines are capable of producing 100% of their rated power at or above 5,000 feet.

4- Operating with an excessively lean mixture for an extended period of time usually results in "fouled" spark plugs.

413. The best procedure to use when attempting to start an overprimed engine is to

P-07 1- boost the battery with an auxiliary power unit.

2- continue to use the starter until the engine fires.

3- handcrank the engine with the throttle open and the aircraft brakes set.

4- follow the manufacturer's instructions.

414. Which statement is true regarding airplane engine operation during cold weather?

P-07 1- Preheating an engine should be done only in an emergency.

2- Engine parts expand, making it difficult to crank the engine.

3- Overpriming could result in poor compression and hard starting.

4- Prolonged idling causes the spark plug electrodes to become saturated with congealed oil and results in shorting out the plugs.

415. One difference between float-type carburetion and fuel injection is that in the latter system

P-07 1- power response is slower.

2- vapor lock is less likely to occur.

3- fuel is distributed to the cylinders more evenly.

4- the throttle controls the flow of air while fuel flow remains constant.

416. When full throttle is used on an unsupercharged engine with the mixture control full rich, the pilot should realize that the engine is being

P-06 1- subjected to damage from preignition.

2- provided additional air in the cylinders for cooling.

3- provided additional fuel in the cylinders for cooling.

4- subjected to damage resulting from detonation.

417. If it is necessary to use a substitute gasoline in an airplane in lieu of that recommended, it should be remembered that

P-05 1- aircraft engines are certificated for operation with either automotive or aviation fuels.

2- automotive gasolines can be used if the octane is equivalent to that of the aviation gasoline recommended.

3- automotive gasolines should not be used, even if the octane is equivalent or better than that of the aviation gasoline recommended.

4- automotive gasolines are recommended, but only for short periods of time.

418. The principal cause of hazardous conditions associated with the wake turbulence of large airplanes is the

P-12 1- high speeds at which large airplanes operate.

2- tornado-like vortices generated by the wingtips.

3- propeller or jet "wash."

4- laminar flow airfoil used on airplane designs.

419. During a takeoff made behind a departing large jet airplane, the pilot can minimize the hazard of wingtip vortices by

P-12 1- extending the takeoff roll and not rotating until well beyond the jet's rotation point.

2- maintaining extra speed on takeoff and climbout.

3- remaining below the jet's flightpath until able to turn clear of its wake.

4- being airborne prior to reaching the jet's rotation point and climbing above its flightpath.

420. What effect would a light crosswind have on the wingtip vortices generated by a large airplane that had just taken off?

P-12 1- Both vortices would move downwind at a greater rate than if the surface wind was directly down the landing runway.

2- The downwind vortex would tend to remain on the runway longer than the upwind vortex.

3- A light crosswind would rapidly dissipate the strength of both vortices.

4- The upwind vortex would tend to remain on the runway longer than the downwind vortex.

421. In which sections of the carburetor would icing most likely occur?

P-11 1- Main air bleed and main discharge nozzle.

2- Venturi and on the throttle valve.

3- Float chamber and fuel inlet screen.

4- Accelerator pump and main metering jet.

422. The first indication of carburetor icing in airplanes equipped with constant-speed propellers would most likely be a

P-11 1- rough running engine followed by loss of RPM.

2- decrease in revolutions per minute.

3- decrease in manifold pressure.

4- rough running engine followed by an increase in manifold pressure.

423. Which statement is true regarding throttle ice in engine induction systems?

P-11 1- Throttle ice is formed at cruise power settings.

2- Throttle ice is usually formed in induction systems when the throttle is closed.

3- Throttle ice affects both fuel injection engines and engines equipped with carburetors.

4- Throttle ice occurs only in combination with impact ice.

424. Which statement is true regarding induction system icing?

P-11 1- Throttle ice is usually formed in the induction system of fuel injection engines.

2- Impact ice affects both fuel injection engines and engines equipped with carburetors.

3- Fuel ice is usually formed in the induction system of fuel injection engines.

4- Induction system icing affects only engines equipped with carburetors.

425. The low temperature that causes carburetor ice in an engine equipped with a float-type carburetor is normally the result of the

P-11 1- freezing temperature of the air entering the carburetor.
2- vaporization of fuel and expansion of air in the carburetor.
3- low volatility of the fuel.
4- compression of air at the carburetor venturi.

426. In an aircraft equipped with a float-type carburetor and a constant-speed propeller, carburetor icing would probably first be detected by

P-11 1- a drop in manifold pressure.
2- a drop in manifold pressure and engine RPM.
3- detonation.
4- a drop in engine RPM.

427. In an airplane equipped with a constant-speed propeller and a manifold pressure (MP) gauge, the presence of carburetor ice can be verified by applying carburetor heat and noting an immediate

P-11 1- decrease in MP with no further change in MP.
2- increase in MP and then a gradual increase in MP.
3- increase in MP and then a gradual decrease in MP.
4- decrease in MP and then a gradual increase in MP.

428. Which conditions should alert a pilot to the possibility of induction icing?

P-11 1- Any temperature below freezing with a relative humidity less than 50%.
2- A temperature between 32° F. and 70° F. with a relative humidity greater than 50%.
3- A temperature between 0° F. and 32° F. with a relative humidity between 30% and 50%.
4- A temperature between 32° F. and 50° F. with a relative humidity less than 50%.

429. In an airplane equipped with a manifold pressure gauge, a tachometer, a cylinder head temperature gauge, and an exhaust gas temperature indicator, the first indication of induction icing will be noted by a decrease in

P-11 1- cylinder head temperature.
2- RPM.
3- manifold pressure.
4- exhaust gas temperature.

430. The installation of oil cooler covers, which have not been recommended by the airplane manufacturer, must be approved by

P-10 1- an engine mechanic.
2- the National Transportation Safety Board.
3- the Federal Aviation Administration.
4- the owner or operator of the airplane.

431. The amount of water absorbed in aviation fuels will

P-09 1- remain the same regardless of temperature changes.
2- increase as the temperature of the fuel decreases.
3- increase as the temperature of the fuel increases.
4- decrease as the temperature of the fuel increases.

432. Detonation during a climb can be corrected by reducing the

P-08 1- manifold pressure.
2- fuel-to-air ratio.
3- propeller RPM.
4- airspeed.

433. The use of too low an octane fuel may cause

P-08 1- a prompt preignition reaction.
2- a cooling effect on cylinders.
3- higher manifold pressure.
4- detonation.

434. If the ground wire between the magneto and the ignition switch becomes disconnected, the most noticeable result will be that the engine

P-16 1- will not operate on the right magneto.
2- cannot be shut down by turning the switch to the "off" position.
3- cannot be started with the switch to the "on" position.
4- will not operate on the left magneto.

435. The probable reason an engine continues to run after the ignition switch has been turned off is

P-16 1- a cracked intake manifold.
2- a broken magneto ground wire.
3- burned out magneto breaker points.
4- faulty magneto timing.

436. In addition to an added safety factor, dual ignition systems also provide

P-16 1- less engine vibrations.
2- shorter engine warmup periods.
3- uniform engine heating.
4- better combustion.

437. In addition to the added safety factor, dual ignition systems also provide

P-16 1- easier starting.
2- better heat control of the engine.
3- improved engine performance.
4- shorter engine warmup periods.

438. Choose the correct statement regarding wake turbulence.

P-12 1- The greatest vortex strength is produced when the generating airplane is heavy, clean, and fast.
2- The primary hazard is loss of control because of induced roll.
3- Vortex generation begins with the initiation of the takeoff roll.
4- Vortices tend to remain level for a period of time.

439. Which pilot action would be most appropriate for minimizing the hazards of wingtip vortices if cleared for takeoff behind a large jet?

P-12 1- Be airborne prior to reaching the point where the jet rotated, and climb above its flightpath.
2- Maintain the ground run until past the point where the jet took off, and climb below the jet's flightpath.
3- Taxi into position on the runway and hold until the vortices subside.
4- Take off and climb at maximum speed to attain positive aircraft control in the event turbulence is encountered.

440. Hazardous vortex turbulence that might be encountered behind large aircraft is created only when that aircraft is

P-12 1- using high power settings.
2- operating at high airspeeds.
3- heavily loaded.
4- developing lift.

441. The loss of aircraft control, which may occur if a light airplane is flown into the wake of a large airplane, is caused principally by

P-12 1- the tornado-like vortices produced by the wingtips of the large airplane.
2- high speed sound waves similar to those produced by sonic "booms."
3- turbulence created by the propellers or jet exhaust of the large airplane.
4- meteorological factors which create wind shear.

442. If wake turbulence is encountered, the probability of induced roll increases when the encountering aircraft's

P-12 1- airspeed is slower than that of the generating aircraft.
2- altitude is higher than that of the generating aircraft.
3- heading is aligned with the flightpath of the generating aircraft.
4- heading is perpendicular to the flightpath of the generating aircraft.

443. Which statement is true relating to the factors which affect fuel consumption?

P-20 1- The rate of fuel consumption is constant for different altitudes if manifold pressure and RPM are held constant.

2- Wind, as well as manifold pressure and RPM, is a factor in determining the rate of fuel consumption.

3- Various combinations of manifold pressure and RPM can produce a given rate of fuel consumption at different altitudes.

4- Only one combination of manifold pressure and RPM can produce a given rate of fuel consumption at different altitudes.

444. The power combination that is most likely to result in excessive cylinder pressures is a relatively

P-20 1- low manifold pressure with a high RPM.

2- high manifold pressure with a low RPM.

3- low manifold pressure with a low RPM.

4- high manifold pressure with a high RPM.

445. An airplane certificated in the utility category means that the airplane could be operated in which maneuvers?

P-19 1- All acrobatic maneuvers.

2- Mild acrobatics, including spins.

3- Any maneuver except acrobatics or spins.

4- Any maneuver requiring an abrupt attitude change.

446. When operating higher output engines, especially those with superchargers, the use of carburetor heat should be regulated by reference to the

P-18 1- degree of roughness at which the engine is operating.

2- manifold pressure or RPM indicator.

3- cylinder head temperature gauge.

4- carburetor air or mixture temperature gauge.

447. Which statement is true regarding the use of carburetor heat or alternate air during flight?

P-18 1- It is preferable to use carburetor heat or alternate air as a prevention, rather than as a deicer.

2- Full carburetor heat should be continuously used when the temperature is below 32° F.

3- Partial heat should be used in airplanes that are not equipped with some instrumentation to determine the effect of the heat.

4- Partial carburetor heat should be used when the temperature is below 32° F.

448. An increase in carburetor air temperature while operating at the same altitude with the same RPM and MP, will produce

P-18 1- more horsepower.
2- less horsepower.
3- fluctuating horsepower.
4- the same horsepower.

449. If carburetor heat is used in such a manner as to provide too much heat at the carburetor intake, it will cause

P-18 1- the engine to idle too fast.

2- a decrease in fuel consumption.

3- a loss of RPM and a reduction of maximum power.

4- excessive cylinder head temperatures.

450. When operating a supercharged engine, the use of carburetor heat should be regulated by reference to the

P-18 1- degree of roughness at which the engine is operating.

2- carburetor air or mixture temperature gauge.

3- manifold pressure or RPM indicator.

4- cylinder air temperature gauge.

MANIFOLD PRESSURE VS. RPM

NOTE: 1. THE LIMIT VALUES OF MANIFOLD PRESSURE APPLY FOR OUTSIDE AIR TEMPERATURES UP TO STANDARD DAY (ISA).
2. FOR OUTSIDE AIR TEMPERATURE ABOVE STANDARD DAY (ISA), THE LIMITS OF MANIFOLD PRESSURE MAY BE INCREASED, AS REQUIRED, UP TO A MAXIMUM OF 1.0 IN HG.

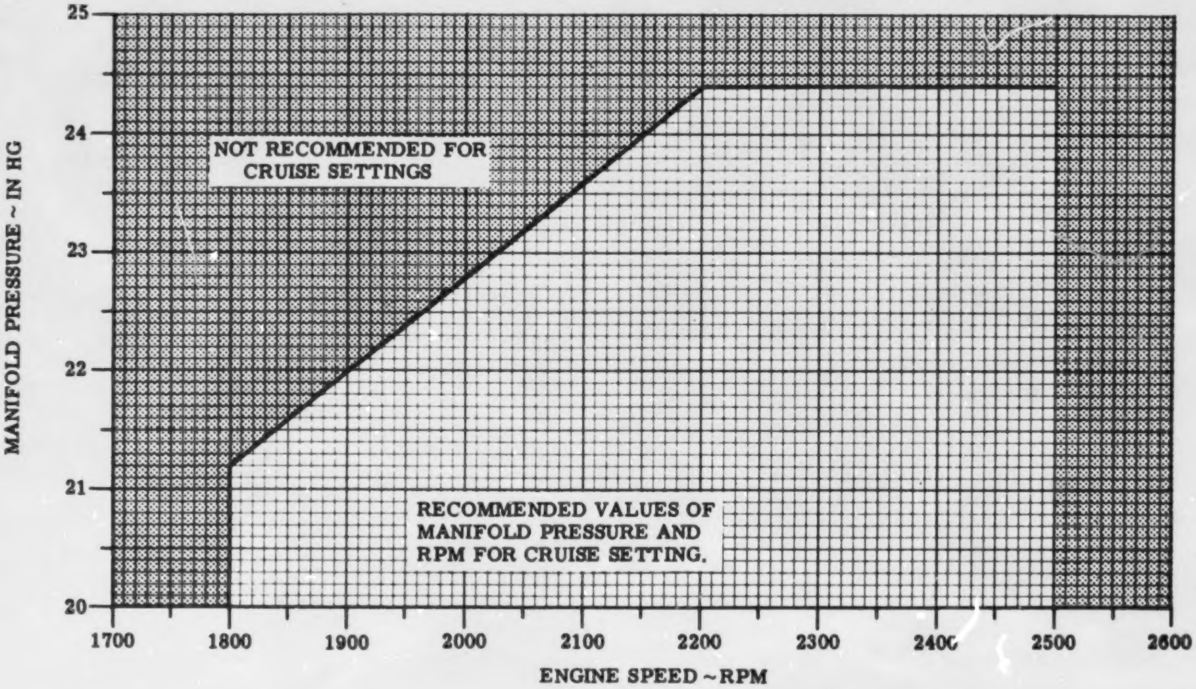


Figure 7

451. Refer to Fig. 7 above. The recommended range of engine speed (RPM) for cruise on a standard day with a manifold pressure of 24" Hg is

P-20
1- 1900 RPM to 2600 RPM.
2- 1950 RPM to 2600 RPM.
3- 2000 RPM to 2500 RPM.
4- 2150 RPM to 2500 RPM.

452. Refer to Fig. 7 above. The recommended range of engine speed (RPM) for cruise on a standard day with a manifold pressure of 23" Hg is

P-20
1- 1900 RPM to 2600 RPM.
2- 2000 RPM to 2500 RPM.
3- 2025 RPM to 2500 RPM.
4- 2100 RPM to 2600 RPM.

453. Refer to Fig. 7 above. The recommended range of engine speed (RPM) for cruise on a standard day with a manifold pressure of 22" Hg is

P-20
1- 1700 RPM to 2500 RPM.
2- 1800 RPM to 2600 RPM.
3- 1900 RPM to 2500 RPM.
4- 2000 RPM to 2600 RPM.

454. Refer to Fig. 7 above. The recommended range of engine speed (RPM) for cruise on a standard day with a manifold pressure of 21" Hg is

P-20
1- 1700 RPM to 2500 RPM.
2- 1800 RPM to 2500 RPM.
3- 1900 RPM to 2600 RPM.
4- 1950 RPM to 2600 RPM.

455. As a precaution to avoid midair collisions during VFR climbs or descents along federal airways, pilots are encouraged to fly

P-23
1- at least 4 NM on either side of the centerline forming the airway.
2- along the centerline of the airway.
3- to the left side of the centerline of the airway.
4- to the right side of the centerline of the airway.

456. What precautions should be used with respect to oxygen systems?

P-22
1- Prohibit smoking while in an aircraft equipped with an oxygen system.
2- An approved flame dispenser with shield should be used in checking the oxygen system for leaks.
3- Assure that medical oxygen has been used to replenish oxygen containers.
4- Do not use grease covered hands, rags, or tools near oxygen equipment.

457. If decompression occurs in a pressurized airplane, a pilot should

P-21
1- instruct each passenger to force air into the middle ear.
2- contact ATC on 121.5 MHz for permission to descend.
3- start a slow descent to a lower altitude to minimize passenger discomfort.
4- make a rapid descent to an appropriate lower altitude.

458. Assume an airplane is at 17,000 feet MSL, with the cabin pressure altitude at 7,000 feet. If the pitot static tube breaks at a point within the cockpit, the altimeter would indicate

P-21
1- the cabin pressure altitude.
2- the altitude above the terrain.
3- 17,000 feet.
4- 10,000 feet (7,000 feet plus 3,000 feet), which is the allowance for the differential pressure.

459. The absolute ceiling is the highest altitude to which an airplane can climb and

P-21
1- maintain a rate of climb of at least 200 fpm.
2- maintain a rate of climb of at least 100 fpm.
3- maintain a rate of climb of at least 50 fpm.
4- maintain level flight.

460. The service ceiling of an airplane is the altitude beyond which

P-21
1- level flight cannot be maintained.
2- a rate of climb of at least 100 fpm cannot be maintained.
3- the airplane is no longer maneuverable.
4- an airspeed of at least 100 MPH cannot be maintained.

461. If the pitot static pressure tubes are broken inside a pressurized cabin during a high altitude flight, the altimeter would probably indicate

P-21
1- lower than actual flight altitude.
2- a fluctuating altitude.
3- sea level.
4- higher than actual flight altitude.

462. The power combination that is least likely to result in excessive cylinder pressures is a relatively

P-20
1- high manifold pressure with a high RPM.
2- high manifold pressure with a low RPM.
3- low manifold pressure with a high RPM.
4- low manifold pressure with a low RPM.

NORMAL TAKE-OFF

ASSOCIATED CONDITIONS:

POWER	TAKE-OFF POWER SET BEFORE BRAKE RELEASE
FLAPS	UP
RUNWAY	PAVED, LEVEL, DRY SURFACE
TAKE-OFF SPEED	IAS AS TABULATED

NOTE: GROUND ROLL IS APPROX. 59% OF TOTAL TAKE-OFF DISTANCE OVER A 50 FT OBSTACLE.

EXAMPLE:

OAT	75°F
PRESSURE ALTITUDE	4000 FT
TAKE-OFF WEIGHT	3200 LBS
HEAD WIND	10 KNOTS
TOTAL TAKE-OFF DISTANCE OVER A 50 FT OBSTACLE	2190 FT
GROUND ROLL (59% OF 2190)	1292 FT
IAS TAKE-OFF SPEED	
LIFT-OFF	79 MPH
AT 50 FT	90 MPH

WEIGHT POUNDS	IAS TAKE-OFF SPEED (ASSUMES ZERO INSTR. ERROR)			
	LIFT-OFF		50 FEET	
	MPH	KNOTS	MPH	KNOTS
3400	81	70	92	80
3200	79	69	90	78
3000	76	66	87	76
2800	73	63	84	73
2600	70	61	80	70
2400	67	58	77	67

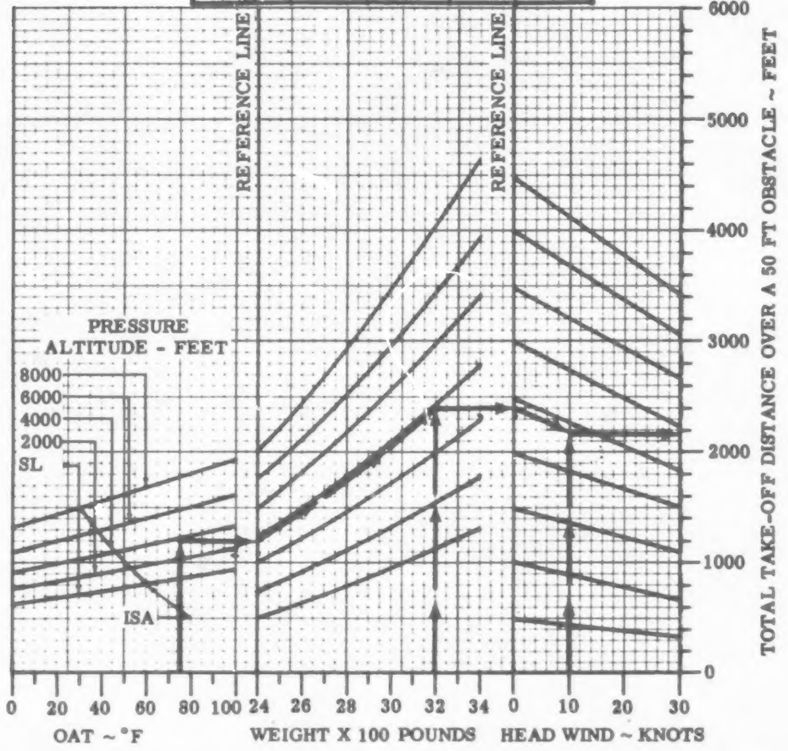


Figure 83

463. Use Figure 8.

GIVEN: Associated Conditions . Fig. 8
Temperature . . . . . . 40° F.
Pressure altitude . . . 2,000 ft.
Weight . . . . 3,200 lbs.
Headwind . . . . 20 knots

What is the total takeoff distance over a 50-foot obstacle?

Q-01
1- 1,450 ft.
2- 1,690 ft.
3- 1,750 ft.
4- 1,810 ft.

464. Use Figure 8.

GIVEN: Associated Conditions . Fig. 8
Temperature . . . . . . 85° F.
Pressure altitude . . . 6,000 ft.
Weight . . . . 3,200 lbs.
Headwind . . . . 15 knots

What is the approximate ground roll required for takeoff over a 50-foot obstacle?

Q-01
1- 1,563 ft.
2- 1,894 ft.
3- 2,172 ft.
4- 2,654 ft.

465. Use Figure 8.

GIVEN: Associated Conditions . Fig. 8
Temperature . . . . . . 45° F.
Pressure altitude . . . 8,000 ft.
Weight . . . . 3,000 lbs.
Headwind . . . . 10 knots

What weight reduction is necessary to take off over a 50-foot obstacle in 2,000 feet?

Q-01
1- 250 lbs.
2- 350 lbs.
3- 400 lbs.
4- 450 lbs.

466. Use Figure 8.

GIVEN: Associated Conditions . Fig. 8
Temperature . . . . . . 75° F.
Pressure altitude . . . 2,000 ft.
Weight . . . . 2,800 lbs.
Headwind . . . . 25 knots

What is the total takeoff distance over a 50-foot obstacle?

Q-01
1- 700 ft.
2- 850 ft.
3- 1,000 ft.
4- 1,150 ft.

467. Use Figure 8.

GIVEN: Associated Conditions . Fig. 8
Temperature . . . . . . 70° F.
Pressure altitude . . . 4,000 ft.
Weight . . . . 3,400 lbs.
Headwind . . . . 15 knots

What is the total takeoff distance over a 50-foot obstacle?

Q-01
1- 2,200 ft.
2- 2,400 ft.
3- 2,600 ft.
4- 2,900 ft.

468. Use Figure 8.

GIVEN: Associated Conditions . Fig. 8
Temperature . . . . . . 60° F.
Pressure altitude . . . 6,000 ft.
Weight . . . . 2,900 lbs.
Headwind . . . . 20 knots

What weight reduction is necessary to take off over a 50-foot obstacle in 1,500 ft.?

Q-01
1- 200 lbs.
2- 300 lbs.
3- 400 lbs.
4- 500 lbs.

469. Use Figure 8.

GIVEN: Associated Conditions . Fig. 8
Temperature . . . . . . 85° F.
Pressure altitude . . . 8,000 ft.
Weight . . . . 3,100 lbs.
Headwind . . . . 10 knots

What is the approximate ground roll required for takeoff over a 50-foot obstacle?

Q-01
1- 1,610 ft.
2- 1,829 ft.
3- 2,356 ft.
4- 3,100 ft.

470. Use Figure 8.

GIVEN: Associated Conditions . Fig. 8
Temperature . . . . . . 80° F.
Pressure altitude . . . 6,000 ft.
Weight . . . . 3,000 lbs.
Headwind . . . . 20 knots

What is the total takeoff distance over a 50-foot obstacle?

Q-01
1- 2,060 ft.
2- 2,100 ft.
3- 2,210 ft.
4- 2,280 ft.

OBSTACLE TAKE-OFF

ASSOCIATED CONDITIONS:

POWER	TAKE-OFF POWER SET BEFORE BRAKE RELEASE
FLAPS	20°
RUNWAY	PAVED, LEVEL, DRY SURFACE
TAKE-OFF SPEED	IAS AS TABULATED

NOTE: GROUND ROLL IS APPROX. 73% OF TOTAL TAKE-OFF DISTANCE OVER A 50 FT OBSTACLE.

EXAMPLE:

OAT	75°F
PRESSURE ALTITUDE	4000 FT
TAKE-OFF WEIGHT	3100 LBS
HEAD WIND	20 KNOTS
TOTAL TAKE-OFF DISTANCE OVER A 50 FT OBSTACLE	1350 FT
GROUND ROLL (73% OF 1350)	986 FT
IAS TAKE-OFF SPEED	
LIFT-OFF	74 MPH
AT 50 FT	74 MPH

WEIGHT POUNDS	IAS TAKE-OFF SPEED (ASSUMES ZERO INSTR. ERROR)			
	LIFT-OFF		50 FEET	
	MPH	KNOTS	MPH	KNOTS
3400	77	67	77	67
3200	75	65	75	65
3000	72	63	72	63
2800	69	60	69	60
2600	66	57	66	57
2400	63	55	63	55

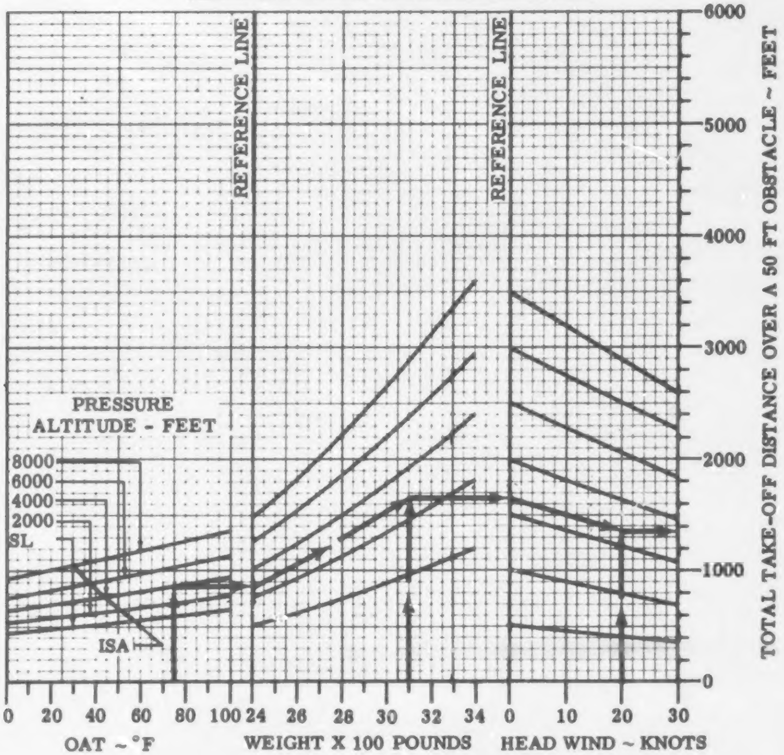


Figure 9

471. Use Figure 9.

GIVEN: Associated Conditions . Fig. 9
Temperature . . . . . . 30° F.
Pressure altitude . . . 6,000 ft.
Weight . . . . 3,300 lbs.
Headwind . . . . 20 knots

What is the total takeoff distance over a 50-foot obstacle?

Q-01
1- 1,200 ft.
2- 1,300 ft.
3- 1,400 ft.
4- 1,500 ft.

472. Use Figure 9.

GIVEN: Associated Conditions . Fig. 9
Temperature . . . . . . 20° F.
Pressure altitude . . . Sea level
Weight . . . . 3,400 lbs.
Headwind . . . . Calm

What is the total takeoff distance over a 50-foot obstacle?

Q-01
1- 900 ft.
2- 1,000 ft.
3- 1,100 ft.
4- 1,200 ft.

473. Use Figure 9.

GIVEN: Associated Conditions . Fig. 9
Temperature . . . . . . 85° F.
Pressure altitude . . . 2,000 ft.
Weight . . . . 2,800 lbs.
Headwind . . . . 10 knots

What is the total takeoff distance over a 50-foot obstacle?

Q-01
1- 800 ft.
2- 900 ft.
3- 1,000 ft.
4- 1,100 ft.

474. Use Figure 9.

GIVEN: Associated Conditions . Fig. 9
Temperature . . . . . . 50° F.
Pressure altitude . . . Sea level
Weight . . . . 2,700 lbs.
Headwind . . . . Calm

What is the total takeoff distance over a 50-foot obstacle?

Q-01
1- 450 ft.
2- 550 ft.
3- 650 ft.
4- 750 ft.

475. Use Figure 9.

GIVEN: Associated Conditions . Fig. 9
Temperature . . . . . . 95° F.
Pressure altitude . . . 6,000 ft.
Weight . . . . 3,400 lbs.
Headwind . . . . 10 knots

What weight reduction is necessary to take off over a 50-foot obstacle in 2,000 ft.?

Q-01
1- 200 lbs.
2- 300 lbs.
3- 400 lbs.
4- 500 lbs.

476. Use Figure 9.

GIVEN: Associated Conditions . Fig. 9
Temperature . . . . . . 75° F.
Pressure altitude . . . 6,000 ft.
Weight . . . . 2,900 lbs.
Headwind . . . . 20 knots

What weight reduction is necessary to take off over a 50-foot obstacle in 1,000 ft.?

Q-01
1- 100 lbs.
2- 200 lbs.
3- 300 lbs.
4- 400 lbs.

477. Use Figure 9.

GIVEN: Associated Conditions . Fig. 9
Temperature . . . . . . 90° F.
Pressure altitude . . . 2,000 ft.
Weight . . . . 3,300 lbs.
Headwind . . . . 10 knots

What is the total takeoff distance over a 50-foot obstacle?

Q-01
1- 1,350 ft.
2- 1,500 ft.
3- 1,650 ft.
4- 1,750 ft.

478. Use Figure 9.

GIVEN: Associated Conditions . Fig. 9
Temperature . . . . . . 100° F.
Pressure altitude . . . 4,000 ft.
Weight . . . . 3,200 lbs.
Headwind . . . . Calm

What is the ground roll required for takeoff over a 50-foot obstacle?

Q-01
1- 1,180 ft.
2- 1,350 ft.
3- 1,540 ft.
4- 1,850 ft.

TAKEOFF DISTANCE

MAXIMUM WEIGHT 3800 LBS

CONDITIONS:
Flaps 10°
2850 RPM and Full Throttle Prior to Brake Release
Mixture Set at Placard Fuel Flow
Cowl Flaps Open
Paved, Level, Dry Runway
Zero Wind

MIXTURE SETTING	
PRESS ALT	PPH
S.L.	144
2000	138
4000	132
6000	126
8000	120

NOTES:

1. Landing gear extended until takeoff obstacle is cleared.
2. Where distance value has been deleted, climb performance after lift-off is less than 150 fpm. Rate of climb is based on landing gear extended and flaps 10° at takeoff speed.
3. Decrease distances 10% for each 10 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2.5 knots.
4. For operation on a dry, grass runway, increase distances by 15% of the "ground roll" figure.

WEIGHT LBS	TAKEOFF SPEED KIAS		PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
	LIFT OFF	AT 50 FT		GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS
3800	66	72	S.L.	1120	1820	1205	1960	1295	2105	1390	2265	1495	2440
			1000	1225	2005	1320	2155	1420	2320	1525	2505	1640	2705
			2000	1345	2210	1445	2380	1555	2570	1675	2785	1800	3020
			3000	1475	2450	1585	2645	1710	2865	1840	3110	1980	3390
			4000	1620	2725	1745	2955	1880	3210	2025	3505	2180	3840
			5000	1785	3055	1925	3325	2075	3630	2235	3990	2410	4415
			6000	1970	3455	2125	3780	2290	4160	2470	4615	2665	5185
			7000	2180	3950	2350	4365	2540	4860	2740	5485	---	---
			8000	2415	4595	2610	5155	---	---	---	---	---	---
3500	63	69	S.L.	925	1495	990	1605	1065	1720	1145	1845	1225	1980
			1000	1010	1640	1085	1760	1165	1885	1250	2030	1340	2180
			2000	1105	1800	1185	1930	1275	2080	1370	2235	1470	2410
			3000	1210	1980	1300	2130	1400	2295	1505	2475	1615	2680
			4000	1325	2190	1425	2360	1535	2550	1650	2755	1775	2990
			5000	1460	2430	1570	2625	1690	2845	1820	3090	1960	3365
			6000	1605	2715	1730	2940	1865	3195	2005	3490	2160	3825
			7000	1770	3050	1910	3320	2060	3630	2220	3990	2395	4415
			8000	1960	3460	2115	3790	2280	4175	2460	4640	2655	5215
3200	60	66	S.L.	755	1220	810	1305	865	1395	930	1490	995	1595
			1000	820	1330	880	1425	945	1525	1015	1635	1090	1750
			2000	895	1455	965	1560	1035	1670	1110	1790	1190	1925
			3000	980	1595	1055	1710	1135	1835	1215	1970	1305	2120
			4000	1075	1755	1155	1880	1240	2025	1335	2180	1435	2350
			5000	1180	1935	1270	2080	1365	2240	1470	2415	1580	2610
			6000	1300	2140	1395	2305	1500	2490	1615	2695	1740	2920
			7000	1430	2380	1540	2575	1655	2785	1785	3025	1920	3295
			8000	1575	2665	1700	2885	1830	3140	1970	3425	2125	3755

Figure 10

479. Use Figure 10 to determine ground roll under the following conditions:

Weight . . . . 3,200 lbs.
Pressure altitude . . . 8,000 ft.
Temperature . . . . 30° C.
Tailwind . . . . 5 knots
Runway length (Paved) . 2,500 ft.

Is the runway length sufficient for takeoff?

Q-01
1- Yes, only 1,970 ft. are needed.
2- Yes, only 2,364 ft. are needed.
3- No, 2,636 ft. are needed.
4- No, 3,425 ft. are needed.

480. Use Figure 10 to determine takeoff distance under the following conditions:

Weight . . . . 3,500 lbs.
Pressure altitude . . . 4,000 ft.
Temperature . . . . 10° C.
Tailwind . . . . 5 knots
Runway length (Paved) . 3,000 ft.

Could a 50-foot obstruction at the end of the runway be cleared?

Q-01
1- Yes, only 1,425 ft. are needed.
2- Yes, only 2,360 ft. are needed.
3- Yes, only 2,932 ft. are needed.
4- No, 3,168 ft. are needed.

481. Use Figure 10 to determine ground roll under the following conditions:

Weight . . . . 3,800 lbs.
Pressure altitude . . . 6,000 ft.
Temperature . . . . 20° C.
Tailwind . . . . 10 knots
Runway length (Paved) . 3,000 ft.

Is the runway length sufficient for takeoff?

Q-01
1- Yes, only 2,290 ft. are needed.
2- Yes, only 2,540 ft. are needed.
3- No, 3,206 ft. are needed.
4- No, 4,160 ft. are needed.

482. Use Figure 10 to determine takeoff distance under the following conditions:

Weight . . . . 3,200 lbs.
Pressure altitude . . . 7,000 ft.
Temperature . . . . 30° C.
Tailwind . . . . 5 knots
Runway length (Paved) . 3,400 ft.

Could a 50-foot obstruction at the end of the runway be cleared?

Q-01
1- Yes, only 3,025 ft. are needed.
2- No, 3,630 ft. are needed.
3- Yes, only 1,785 ft. are needed.
4- No, 3,425 ft. are needed.

483. Use Figure 10 to determine ground roll under the following conditions:

Weight . . . . 3,500 lbs.
Pressure altitude . . . 3,000 ft.
Temperature . . . . 20° C.
Headwind . . . . 15 knots
Runway length (Paved) . 1,500 ft.

Is the runway length sufficient for takeoff?

Q-01
1- Yes, only 1,400 ft. are needed.
2- Yes, only 1,190 ft. are needed.
3- No, 1,951 ft. are needed.
4- No, 2,295 ft. are needed.

484. Use Figure 10 to determine takeoff distance under the following conditions:

Weight . . . . 3,500 lbs.
Pressure altitude . . . 6,000 ft.
Temperature . . . . 20° C.
Headwind . . . . 16 knots
Runway length (Paved) . 2,600 ft.

Could a 50-foot obstruction at the end of the runway be cleared?

Q-01
1- Yes, only 1,865 ft. are needed.
2- Yes, only 2,163 ft. are needed.
3- No, 2,684 ft. are needed.
4- No, 3,195 ft. are needed.

485. Use Figure 10 to determine ground roll under the following conditions:

Weight . . . . 3,800 lbs.
Pressure altitude . . . 5,000 ft.
Temperature . . . . 40° C.
Headwind . . . . 12 knots
Runway length (Paved) . 2,000 ft.

Is the runway length sufficient for takeoff?

Q-01
1- Yes, only 1,800 ft. are needed.
2- No, 2,410 ft. are needed.
3- Yes, only 1,980 ft. are needed.
4- No, 2,121 ft. are needed.

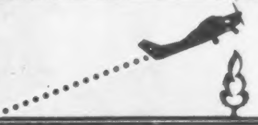
486. Use Figure 10 to determine takeoff distance under the following conditions:

Weight . . . . 3,800 lbs.
Pressure altitude . . . 4,000 ft.
Temperature . . . . 30° C.
Headwind . . . . 13 knots
Runway length (Paved) . 3,000 ft.

Could a 50-foot obstruction at the end of the runway be cleared?

Q-01
1- Yes, only 2,025 ft. are needed.
2- No, 3,050 ft. are needed.
3- Yes, only 2,635 ft. are needed.
4- No, 3,505 ft. are needed.

TAKE-OFF DATA



TAKE-OFF DISTANCE WITH 20° FLAPS FROM HARD-SURFACED RUNWAY

GROSS WEIGHT LBS.	IAS AT 50 FT. MPH	HEAD WIND MPH	AT SEA LEVEL & 59°F		AT 2500 FEET & 50°F		AT 5000 FT. & 41°F		AT 7500 FT. & 32°F	
			GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE
2200	55	0	345	680	405	770	480	885	580	1040
		15	205	460	245	525	295	615	365	725
		30	100	275	120	320	155	380	195	460
2600	60	0	500	915	585	1045	705	1230	855	1470
		15	310	635	370	735	455	870	560	1055
		30	165	395	200	465	255	565	325	695
3000	64	0	695	1210	820	1405	990	1675	1205	2045
		15	450	855	535	1005	660	1215	815	1505
		30	250	555	310	665	390	820	500	1030

NOTE: INCREASE DISTANCES 10% FOR EACH 25°F ABOVE STANDARD TEMPERATURE FOR PARTICULAR ALTITUDE.

CLIMB DATA

GROSS WEIGHT LBS.	AT SEA LEVEL & 59°F			AT 5000 FT. & 41°F			AT 10000 FT. & 23°F			AT 15000 FT. & 5°F			AT 20000 FT. & -12°F		
	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	GAL. OF FUEL USED	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	FROM S.L. FUEL USED	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	FROM S.L. FUEL USED	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	FROM S.L. FUEL USED	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	FROM S.L. FUEL USED
2200	96	1900	2.0	92	1530	2.9	88	1150	3.9	83	780	5.1	78	410	6.8
2600	100	1540	2.0	97	1210	3.1	93	890	4.4	88	580	6.1	84	250	8.6
3000	105	1270	2.0	101	980	3.4	97	690	5.0	94	400	7.3	90	120	11.5

NOTE: FULL THROTTLE, 2625 RPM, MIXTURE AT RECOMMENDED LEANING SCHEDULE, FLAPS AND GEAR UP. FUEL USED INCLUDES WARM-UP AND TAKE-OFF ALLOWANCE.

LANDING DISTANCE TABLE

GROSC WEIGHT LBS.	APPROACH IAS MPH	AT SEA LEVEL & 59°F		AT 2500 FT & 50°F		AT 5000 FT & 41°F		AT 7500 FT & 32°F	
		GROUND ROLL	TO CLEAR 50' OBSTACLE	GROUND ROLL	TO CLEAR 50' OBSTACLE	GROUND ROLL	TO CLEAR 50' OBSTACLE	GROUND ROLL	TO CLEAR 50' OBSTACLE
2200	61	355	945	385	980	415	1020	445	1060
2600	66	420	1030	455	1070	490	1110	530	1155
3000	71	485	1110	525	1150	565	1200	610	1255

NOTE: REDUCE LANDING DISTANCES 10% FOR EACH 6 MPH HEADWIND. FLAPS 40° AND POWER OFF.

Figure 11

487. Use Figure 11.

GIVEN: Weight . . . . 2,700 lbs.
Temperature . . . . . 43° F.
Pressure altitude . . 4,500 ft.
Headwind . . . . 12 MPH

Find the ground roll during landing with the conditions given.

Q-06 1- 236 ft.
2- 309 ft.
3- 402 ft.
4- 512 ft.

488. Use Figure 11.

GIVEN: Weight . . . . 2,700 lbs.
Temperature . . . . . 36° F.
Pressure altitude . . 6,500 ft.
Headwind . . . . 18 MPH

Find the ground roll during landing with the conditions given.

Q-06 1- 385 ft.
2- 473 ft.
3- 550 ft.
4- 592 ft.

489. Use Figure 11.

GIVEN: Weight . . . . 2,700 lbs.
Temperature . . . . . 37° F.
Pressure altitude . . 6,000 ft.
Headwind . . . . 12 MPH

Find the landing distance to clear a 50-foot obstacle

Q-01 1- 830 ft.
2- 922 ft.
3- 1,036 ft.
4- 1,152 ft.

490. Use Figure 11.

GIVEN: Weight . . . . 2,500 lbs.
Temperature . . . . . 47° F.
Pressure altitude . . 3,200 ft.
Headwind . . . . 12 MPH

Find the landing distance to clear a 50-foot obstacle.

Q-01 1- 846 ft.
2- 953 ft.
3- 1,057 ft.
4- 1,148 ft.

491. Use Figure 11.

GIVEN: Weight . . . . 2,600 lbs.
Temperature . . . . . 71° F.
Pressure altitude . . 3,500 ft.
Headwind . . . . 25 MPH

Find the ground run required for takeoff under the conditions given.

Q-01 1- 129 ft.
2- 183 ft.
3- 223 ft.
4- 311 ft.

492. Use Figure 11.

GIVEN: Weight . . . . 2,200 lbs.
Temperature . . . . . 77° F.
Pressure altitude . . 2,000 ft.
Headwind . . . . 20 MPH

Find the ground run required for takeoff under the conditions given.

Q-01 1- 106 ft.
2- 216 ft.
3- 310 ft.
4- 389 ft.

493. Use Figure 11.

GIVEN: Weight . . . . 2,300 lbs.
Temperature . . . . . 72° F.
Pressure altitude . . 3,200 ft.
Headwind . . . . 15 MPH

Find the takeoff distance required to clear a 50-foot obstacle.

Q-01 1- 553 ft.
2- 606 ft.
3- 668 ft.
4- 754 ft.

494. Use Figure 11.

GIVEN: Weight . . . . 2,700 lbs.
Temperature . . . . . 62° F.
Pressure altitude . . 6,000 ft.
Headwind . . . . 15 MPH

Find the takeoff distance required to clear a 50-foot obstacle.

Q-01 1- 893 ft.
2- 995 ft.
3- 1,041 ft.
4- 1,145 ft.

MAXIMUM CLIMB

TIME TO CLIMB

ASSOCIATED CONDITIONS:

POWER	MAXIMUM CONTINUOUS
GEAR AND FLAPS	UP
TAKE-OFF WEIGHT	3400 POUNDS
AIRSPEED	BEST RATE-OF-CLIMB SPEED

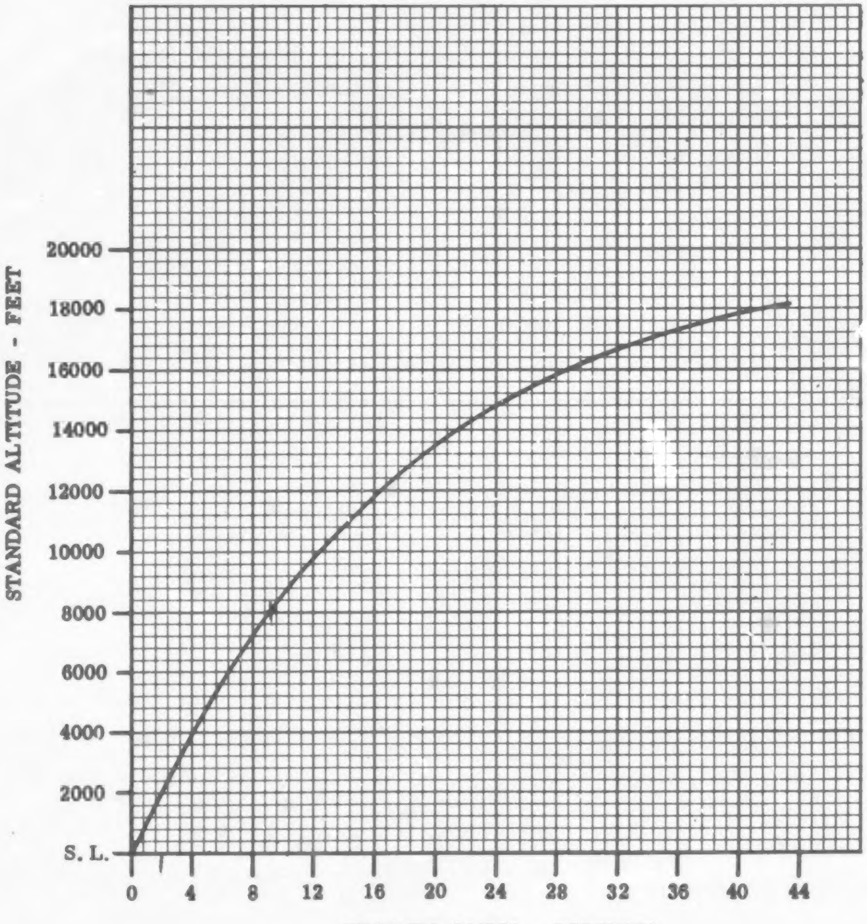


Figure 12

495. Use Figure 12.

GIVEN: Associated Conditions . Fig. 12
Groundspeed . . . . . . 150 MPH

What is the approximate distance traveled when climbing from 4,000 ft. to 10,000 ft.?

Q-02
1- 17 miles.
2- 21 miles.
3- 26 miles.
4- 25 miles.

496. Use Figure 12.

GIVEN: Associated Conditions . Fig. 12
Groundspeed . . . . . . 145 MPH

What is the approximate distance traveled when climbing from sea level to 8,000 ft.?

Q-02
1- 17 miles.
2- 21 miles.
3- 22 miles.
4- 25 miles.

497. Use Figure 12.

GIVEN: Associated Conditions . Fig. 12
Groundspeed . . . . . . 140 MPH

What is the approximate distance traveled when climbing from 3,000 ft. to 12,000 ft.?

Q-02
1- 27 miles.
2- 32 miles.
3- 37 miles.
4- 42 miles.

498. Use Figure 12.

GIVEN: Associated Conditions . Fig. 12
Groundspeed . . . . . . 135 MPH

What is the approximate distance traveled when climbing from 4,000 ft. to 14,000 ft.?

Q-02
1- 39 miles.
2- 42 miles.
3- 44 miles.
4- 48 miles.

499. Use Figure 12.

GIVEN: Associated Conditions . Fig. 12
Groundspeed . . . . . . 130 MPH

What is the approximate distance traveled when climbing from 2,000 ft. to 8,000 ft.?

Q-02
1- 13 miles.
2- 14 miles.
3- 15 miles.
4- 17 miles.

500. Use Figure 12.

GIVEN: Associated Conditions . Fig. 12
Groundspeed . . . . . . 120 MPH

What is the approximate distance traveled when climbing from sea level to 10,000 ft.?

Q-02
1- 25 miles.
2- 31 miles.
3- 33 miles.
4- 36 miles.

501. Use Figure 12.

GIVEN: Associated Conditions . Fig. 12
Fuel consumption . . . 14.5 GPH

What is the approximate fuel required to climb from 6,000 ft. to 14,000 ft.?

Q-02
1- 3.1 gals.
2- 3.7 gals.
3- 4.6 gals.
4- 5.0 gals.

502. Use Figure 12.

GIVEN: Associated Conditions . Fig. 12
Fuel consumption . . . 12 GPH

What is the approximate fuel required to climb from 4,000 ft. to 10,000 ft.?

Q-02
1- 1.0 gal.
2- 1.6 gals.
3- 2.9 gals.
4- 3.4 gals.

503. Use Figure 12.

GIVEN: Associated Conditions . Fig. 12
Fuel consumption . . . 15.0 GPH

What is the approximate fuel required to climb from 2,000 ft. to 14,000 ft.?

Q-02
1- 3.6 gals.
2- 4.3 gals.
3- 4.9 gals.
4- 5.5 gals.

504. Use Figure 12.

GIVEN: Associated Conditions . Fig. 12
Fuel consumption . . . 13.5 GPH

What is the approximate fuel required to climb from sea level to 12,000 ft.?

Q-02
1- 3.00 gals.
2- 3.25 gals.
3- 3.75 gals.
4- 4.00 gals.

MAXIMUM CLIMB

RATE OF CLIMB

ASSOCIATED CONDITIONS:

POWER	MAXIMUM CONTINUOUS
FLAPS	UP
GEAR	UP
AIRSPEED	BEST RATE-OF-CLIMB SPEED

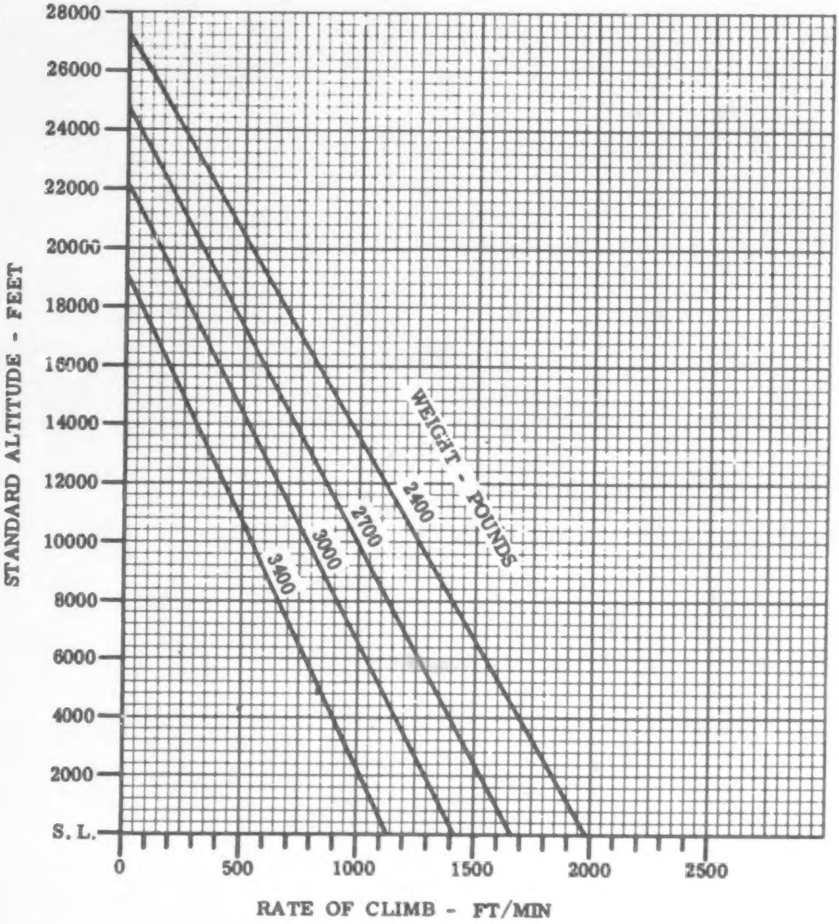


Figure 13

93

505. Use Figure 13.

GIVEN: Associated Conditions . Fig. 13
Weight . . . . 3,000 lbs.
Rate of climb . . . . . average

What is the approximate time required to climb from 2,000 ft. to 6,000 ft.?

Q-02
1- 2 min. 05 sec.
2- 2 min. 30 sec.
3- 3 min. 20 sec.
4- 4 min. 20 sec.

506. Use Figure 13.

GIVEN: Associated Conditions . Fig. 13
Weight . . . . 3,400 lbs.
Rate of climb . . . . . average

What is the approximate time required to climb from 4,000 ft. to 10,000 ft.?

Q-02
1- 7 min. 38 sec.
2- 7 min. 54 sec.
3- 8 min. 20 sec.
4- 9 min. 23 sec.

507. Use Figure 13.

GIVEN: Associated Conditions . Fig. 13
Weight . . . . 2,400 lbs.
Rate of climb . . . . . average

What is the approximate time required to climb from 3,000 ft. to 12,000 ft.?

Q-02
1- 4 min. 40 sec.
2- 5 min. 10 sec.
3- 5 min. 38 sec.
4- 6 min. 15 sec.

508. Use Figure 13.

GIVEN: Associated Conditions . Fig. 13
Weight . . . . 2,400 lbs.

At what altitude would the service ceiling (rate of climb 100'/min.) be reached?

Q-02
1- 25,000 ft.
2- 25,400 ft.
3- 25,800 ft.
4- 26,600 ft.

509. Use Figure 13.

GIVEN: Associated Conditions . Fig. 13
Weight . . . . 2,700 lbs.

At what altitude would the service ceiling (rate of climb 100'/min.) be reached?

Q-02
1- 22,350 ft.
2- 23,300 ft.
3- 23,700 ft.
4- 24,000 ft.

510. Use Figure 13.

GIVEN: Associated Conditions . Fig. 13
Weight . . . . 2,700 lbs.
Rate of climb . . . . . average

What is the approximate time required to climb from 2,000 ft. to 10,000 ft.?

Q-02
1- 4 min. 30 sec.
2- 5 min. 10 sec.
3- 5 min. 45 sec.
4- 6 min. 25 sec.

511. Use Figure 13.

GIVEN: Associated Conditions . Fig. 13
Weight . . . . 3,000 lbs.
Rate of climb . . . . . average

What is the approximate time required to climb from 4,000 ft. to 8,000 ft.?

Q-02
1- 2 min. 50 sec.
2- 3 min. 20 sec.
3- 3 min. 50 sec.
4- 4 min. 30 sec.

512. Use Figure 13.

GIVEN: Associated Conditions . Fig. 13
Weight . . . . 3,400 lbs.
Rate of climb . . . . . average

What is the approximate time required to climb from 6,000 ft. to 12,000 ft.?

Q-02
1- 8 min.
2- 10 min.
3- 12 min.
4- 14 min.

513. Use Figure 13.

GIVEN: Associated Conditions . Fig. 13
Weight . . . . 3,000 lbs.

At what altitude would the service ceiling (rate of climb 100'/min.) be reached?

Q-02
1- 20,300 ft.
2- 20,600 ft.
3- 20,900 ft.
4- 21,200 ft.

514. Use Figure 13.

GIVEN: Associated Conditions . Fig. 13
Weight . . . . 3,400 lbs.

At what altitude would the service ceiling (rate of climb 100'/min.) be reached?

Q-02
1- 16,600 ft.
2- 17,000 ft.
3- 17,400 ft.
4- 17,800 ft.

TIME, FUEL, AND DISTANCE TO CLIMB

NORMAL CLIMB - 100 KIAS

CONDITIONS:
Flaps Up
Gear Up
2550 RPM
25 Inches MP or Full Throttle
Cowl Flaps Open
Standard Temperature

MIXTURE SETTING	
PRESS ALT	PPH
S.L. to 4000	108
8000	96
12,000	84

NOTES:
1. Add 12 pounds of fuel for engine start, taxi and takeoff allowance.
2. Increase time, fuel and distance by 10% for each 10°C above standard temperature.
3. Distances shown are based on zero wind.

WEIGHT LBS	PRESS ALT FT	RATE OF CLIMB FPM	FROM SEA LEVEL		
			TIME MIN	FUEL USED POUNDS	DISTANCE NM
3800	S.L.	580	0	0	0
	2000	580	3	6	6
	4000	570	7	12	12
	6000	470	11	19	19
	8000	365	16	27	28
	10,000	265	22	37	40
	12,000	165	32	51	59
3500	S.L.	685	0	0	0
	2000	685	3	5	5
	4000	675	6	11	10
	6000	565	9	16	16
	8000	455	13	23	23
	10,000	350	18	31	33
	12,000	240	25	41	46
3200	S.L.	800	0	0	0
	2000	800	2	4	4
	4000	795	5	9	8
	6000	675	8	14	13
	8000	560	11	19	19
	10,000	445	15	25	27
	12,000	325	20	33	37

TIME, FUEL, AND DISTANCE TO CLIMB

MAXIMUM RATE OF CLIMB

CONDITIONS:
Flaps Up
Gear Up
2700 RPM
Full Throttle
Mixture Set at Placard Fuel Flow
Cowl Flaps Open
Standard Temperature

MIXTURE SETTING	
PRESS ALT	PPH
S.L.	138
4000	126
8000	114
12,000	102

NOTES:
1. Add 12 pounds of fuel for engine start, taxi and takeoff allowance.
2. Increase time, fuel and distance by 10% for each 10°C above standard temperature.
3. Distances shown are based on zero wind.

WEIGHT LBS	PRESS ALT FT	CLIMB SPEED KIAS	RATE OF CLIMB FPM	FROM SEA LEVEL		
				TIME MIN	FUEL USED POUNDS	DISTANCE NM
3800	S.L.	97	860	0	0	0
	2000	95	760	2	6	4
	4000	94	660	5	12	9
	6000	93	565	9	18	14
	8000	91	465	13	26	21
	10,000	90	365	18	35	29
	12,000	89	265	24	47	41
3500	S.L.	96	990	0	0	0
	2000	94	885	2	5	3
	4000	93	780	5	10	7
	6000	91	675	7	16	12
	8000	90	570	11	22	17
	10,000	89	465	15	29	24
	12,000	87	360	20	38	32
3200	S.L.	94	1135	0	0	0
	2000	92	1020	2	4	3
	4000	91	910	4	9	6
	6000	90	800	6	14	10
	8000	88	685	9	19	14
	10,000	87	575	12	25	20
	12,000	86	465	16	32	26

Figure 14

515. Use the appropriate chart in Figure 14 for computations.

Weight . . . . 3,500 lbs.
Airport pressure altitude . 2,000 ft.
Temperature . . . . 19° C.

Using a maximum rate of climb under the conditions given, how much fuel would be used from engine start to 12,000 ft. pressure altitude?

Q-02 1- 33 lbs.
2- 35 lbs.
3- 38 lbs.
4- 48 lbs.

516. Use the appropriate chart in Figure 14 for computations.

Weight . . . . 3,800 lbs.
Airport pressure altitude . 4,000 ft.
Temperature . . . . 30° C.

Using a maximum rate of climb under the conditions given, how much fuel would be used from engine start to 10,000 ft. pressure altitude?

Q-02 1- 23 lbs.
2- 28 lbs.
3- 35 lbs.
4- 40 lbs.

517. Use the appropriate chart in Figure 14 for computations.

Weight . . . . 3,500 lbs.
Airport pressure altitude . 6,000 ft.
Temperature . . . . 22° C.

Using a maximum rate of climb under the conditions given, how much fuel would be used from engine start to 12,000 ft. pressure altitude?

Q-02 1- 16 lbs.
2- 22 lbs.
3- 26 lbs.
4- 38 lbs.

518. Use the appropriate chart in Figure 14 for computations.

Weight . . . . 3,200 lbs.
Airport pressure altitude . 2,000 ft.
Temperature . . . . 27° C.

Using a maximum rate of climb under the conditions given, how much fuel would be used from engine start to 6,000 ft. pressure altitude?

Q-02 1- 10 lbs.
2- 12 lbs.
3- 14 lbs.
4- 24 lbs.

519. Use the appropriate chart in Figure 14 for computations.

Weight . . . . 3,800 lbs.
Airport pressure altitude . 4,000 ft.
Temperature . . . . 26° C.

Using a normal climb under the conditions given, how much fuel would be used from engine start to 12,000 feet pressure altitude?

Q-02 1- 39 lbs.
2- 46 lbs.
3- 51 lbs.
4- 58 lbs.

520. Use the appropriate chart in Figure 14 for computations.

Weight . . . . 3,200 lbs.
Airport pressure altitude . 2,000 ft.
Temperature . . . . 24° C.

Using a normal climb under the conditions given, how much fuel would be used from engine start to 10,000 feet pressure altitude?

Q-02 1- 21 lbs.
2- 23 lbs.
3- 25 lbs.
4- 36 lbs.

521. Use the appropriate chart in Figure 14 for computations.

Weight . . . . 3,500 lbs.
Airport pressure altitude . 4,000 ft.
Temperature . . . . 21° C.

Using a normal climb under the conditions given, how much fuel would be used from engine start to 10,000 feet pressure altitude?

Q-02 1- 20 lbs.
2- 23 lbs.
3- 31 lbs.
4- 35 lbs.

522. Use the appropriate chart in Figure 14 for computations.

Weight . . . . 3,800 lbs.
Airport pressure altitude . 2,000 ft.
Temperature . . . . 28° C.

Using a normal climb under the conditions given, how much fuel would be used from engine start to 8,000 feet pressure altitude?

Q-02 1- 21 lbs.
2- 24 lbs.
3- 27 lbs.
4- 36 lbs.

CRUISE OPERATION

WEIGHT 3400 LBS

NO.	% POWER	ENG SPEED RPM	BHP
1	45	2100	128
2	50	2100	142
3	55	2100	157
4	60	2200	171
5	65	2300	185
6	70	2400	200
7	75	2500	214

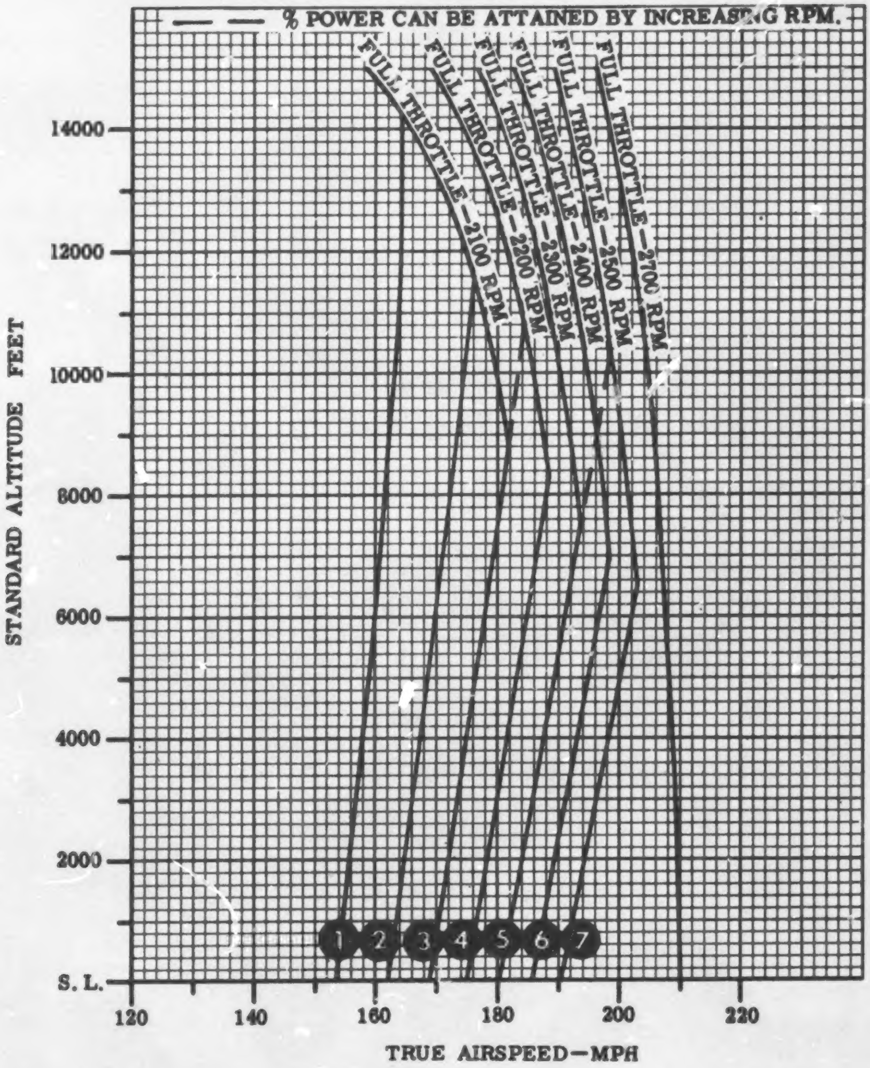


Figure 15

523. Use Figure 15.

GIVEN: Weight . . . . 3,400 lbs.
Standard altitude . . . 9,500 ft.
Power (full throttle) . 2100 RPM

Under the conditions given, what is the true airspeed?

Q-03
1- 169 MPH.
2- 175 MPH.
3- 181 MPH.
4- 185 MPH.

524. Use Figure 15.

GIVEN: Weight . . . . 3,400 lbs.
Standard altitude . . . 8,500 ft.
Power (full throttle) . 2200 RPM

Under the conditions given, what is the true airspeed?

Q-03
1- 175 MPH.
2- 178 MPH.
3- 188 MPH.
4- 190 MPH.

525. Use Figure 15.

GIVEN: Weight . . . . 3,400 lbs.
Standard altitude . . . 10,000 ft.
Power (full throttle) . 2500 RPM

Under the conditions given, what is the true airspeed?

Q-03
1- 180 MPH.
2- 190 MPH.
3- 199 MPH.
4- 206 MPH.

526. Use Figure 15.

GIVEN: Weight . . . . 3,400 lbs.
Standard altitude . . . 9,000 ft.
Power (full throttle) . 2400 RPM

Under the conditions given, what is the true airspeed?

Q-03
1- 180 MPH.
2- 186 MPH.
3- 196 MPH.
4- 198 MPH.

527. Use Figure 15.

GIVEN: Weight . . . . 3,400 lbs.
Standard altitude . . 10,500 ft.
Power 50%

Under the conditions given, what are the brake horsepower and true airspeed?

Q-03
1- 142 BHP and 162 MPH.
2- 142 BHP and 175 MPH.
3- 162 BHP and 175 MPH.
4- 175 BHP and 175 MPH.

528. Use Figure 15.

GIVEN: Weight . . . . 3,400 lbs.
Standard altitude . . 5,000 ft.
Power 75%

Under the conditions given, what are the brake horsepower and true airspeed?

Q-03
1- 200 BHP and 190 MPH.
2- 200 BHP and 214 MPH.
3- 214 BHP and 190 MPH.
4- 214 BHP and 200 MPH.

529. Use Figure 15.

GIVEN: Weight . . . . 3,400 lbs.
Standard altitude . . 8,500 ft.
Power 55%

Under the conditions given, what are the brake horsepower and true airspeed?

Q-03
1- 142 BHP and 181 MPH.
2- 154 BHP and 172 MPH.
3- 157 BHP and 169 MPH.
4- 157 BHP and 181 MPH.

530. Use Figure 15.

GIVEN: Weight . . . . 3,400 lbs.
Standard altitude . . 6,500 ft.
Power 65%

Under the conditions given, what are the brake horsepower and true airspeed?

Q-03
1- 183 BHP and 180 MPH.
2- 185 BHP and 180 MPH.
3- 185 BHP and 192 MPH.
4- 192 BHP and 192 MPH.

FUEL CONSUMPTION VS BRAKE HORSEPOWER

NOTE:

TAKE-OFF AND CLIMB FUEL FLOW
PROVIDES ADDITIONAL COOLING IN
HIGH AMBIENT TEMPERATURES

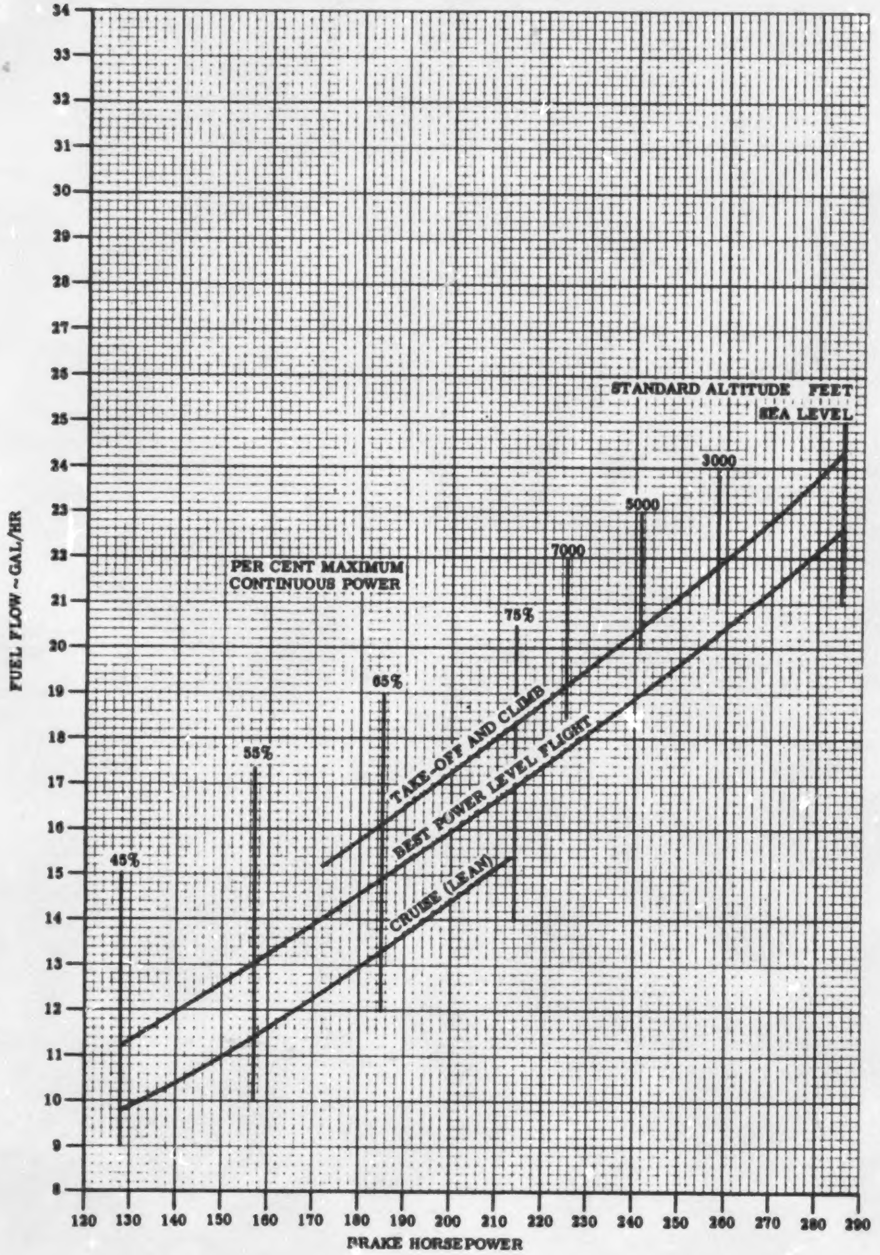


Figure 16

531. Use Figure 16. What are the fuel flow and brake horsepower on takeoff from an airport located at 3,000 feet?

Q-03 1- 21.6 gal./hr. and 258 HP.
2- 21.8 gal./hr. and 259 HP.
3- 21.8 gal./hr. and 258 HP.
4- 22.0 gal./hr. and 259 HP.

532. Use Figure 16. What are the fuel flow and brake horsepower on takeoff from an airport at sea level?

Q-03 1- 21.3 gal./hr. and 290 HP.
2- 22.4 gal./hr. and 290 HP.
3- 23.6 gal./hr. and 285 HP.
4- 24.3 gal./hr. and 285 HP.

533. Use Figure 16.

GIVEN: Fuel quantity . . . . . 47 gals.
Power - cruise (lean) . 55%

Under the conditions given, approximately how much flight time would be available with a 45-minute reserve remaining?

Q-03 1- 3 hrs. 08 min.
2- 3 hrs. 22 min.
3- 3 hrs. 43 min.
4- 4 hrs. 06 min.

534. Use Figure 16.

GIVEN: Fuel quantity . . . . . . 65 gals.
Best power - level flt. . 55%

Under the conditions given, approximately how much flight time would be available with a 30-minute reserve remaining?

Q-03 1- 4 hrs. 06 min.
2- 4 hrs. 17 min.
3- 4 hrs. 30 min.
4- 5 hrs. 04 min.

535. Use Figure 16.

GIVEN: Fuel quantity . . . . . . 42 gals.
Best power - level flt. . 45%

Under the conditions given, approximately how much flight time would be available with a 30-minute reserve remaining?

Q-03 1- 3 hrs. 06 min.
2- 3 hrs. 14 min.
3- 3 hrs. 34 min.
4- 3 hrs. 54 min.

536. Use Figure 16.

GIVEN: Fuel quantity . . . . . . 36 gals.
Power - cruise (lean) . . 45%

Under the conditions given, approximately how much flight time would be available with a 20-minute reserve remaining?

Q-03 1- 2 hrs. 40 min.
2- 3 hrs. 00 min.
3- 3 hrs. 20 min.
4- 3 hrs. 40 min.

537. Use Figure 16. Approximately how much fuel would be consumed when climbing at 75% power for 7 minutes?

Q-03 1- 1.8 gals.
2- 2.1 gals.
3- 2.4 gals.
4- 2.6 gals.

538. Use Figure 16. Approximately how much fuel would be consumed when climbing at 65% power for 11 minutes?

Q-03 1- 2.5 gals.
2- 2.7 gals.
3- 2.9 gals.
4- 3.2 gals.

539. Use Figure 16.

GIVEN: Fuel quantity . . . . . . 54 gals.
Best power - level flt. . 65%

Under the conditions given, approximately how much flight time would be available with a 20-minute reserve remaining?

Q-03 1- 3 hrs. 06 min.
2- 3 hrs. 17 min.
3- 3 hrs. 37 min.
4- 3 hrs. 46 min.

540. Use Figure 16.

GIVEN: Fuel quantity . . . . . . 45 gals.
Power - cruise (lean) . . 65%

Under the conditions given, approximately how much flight time would be available and still have a 30-minute reserve?

Q-03 1- 2 hrs. 52 min.
2- 3 hrs. 06 min.
3- 3 hrs. 15 min.
4- 3 hrs. 22 min.

HORSEPOWER SETTING - IO-520-B

SEA LEVEL								2000 FEET		
MP AT 2500 RPM	MP AT 2300 RPM	MP AT 2100 RPM	OAT °F	% BHP	BHP	FUEL FLOW P P H /G P H		MP AT 2500 RPM	MP AT 2300 RPM	MP AT 2100 RPM
23.2	-	-	-20	75	214	92	15.3	23.0	-	-
21.1	22.8	-		65	185	80	13.35	20.8	22.5	-
18.8	20.2	22.0		55	157	69	11.5	18.6	20.0	21.7
16.6	17.7	19.1		45	128	58	9.7	16.4	17.5	18.9
23.7	-	-	0	75	214	92	15.3	23.4	-	-
21.4	23.1	-		65	185	80	13.35	21.2	22.9	-
19.1	20.5	22.4		55	157	69	11.5	18.9	20.3	22.1
16.8	18.0	19.5		45	128	58	9.7	16.7	17.8	19.2
24.0	-	-	+20	75	214	92	15.3	23.7	-	-
21.7	23.5	-		65	185	80	13.35	21.5	23.2	-
19.4	20.9	22.7		55	157	69	11.5	19.2	20.6	22.5
17.0	18.2	19.8		45	128	58	9.7	16.8	18.0	19.5
24.4	-	-	+40	75	214	92	15.3	24.1	-	-
22.1	23.9	-		65	185	80	13.35	21.8	23.6	-
19.7	21.2	23.1		55	157	69	11.5	19.5	20.9	22.8
17.2	18.5	20.1		45	128	58	9.7	17.1	18.3	19.8
24.8	-	-	+60	75	214	92	15.3	24.5	-	-
22.4	24.2	-		65	185	80	13.35	22.2	24.0	-
20.0	21.5	23.5		55	157	69	11.5	19.8	21.3	23.2
17.5	18.8	20.4		45	128	58	9.7	17.3	18.6	20.1
25.2	-	-	+80	75	214	92	15.3	24.9	-	-
22.8	24.7	-		65	185	80	13.35	22.5	24.4	-
20.2	21.8	23.8		55	157	69	11.5	20.1	21.6	23.5
17.7	19.0	20.6		45	128	58	9.7	17.5	18.8	20.4
25.5	-	-	+100	75	214	92	15.3	25.2	-	-
23.0	-	-		65	185	80	13.35	22.8	24.7	-
20.5	22.1	-		55	157	69	11.5	20.2	21.9	23.8
17.9	19.2	20.9		45	128	58	9.7	17.7	19.0	20.7

HORSEPOWER SETTING - IO-520-B

4000 FEET								6000 FEET		
MP AT 2500 RPM	MP AT 2300 RPM	MP AT 2100 RPM	OAT °F	% BHP	BHP	FUEL FLOW P P H /G P H		MP AT 2500 RPM	MP AT 2300 RPM	MP AT 2100 RPM
22.6	-	-	-20	75	214	92	15.3	22.2	-	-
20.5	22.2	-		65	185	80	13.35	20.2	21.7	-
18.3	19.7	21.4		55	157	69	11.5	18.0	19.4	21.0
16.2	17.3	18.7		45	128	58	9.7	15.9	17.0	18.3
23.0	-	-	0	75	214	92	15.3	22.5	-	-
20.8	22.5	-		65	185	80	13.35	20.5	22.1	-
18.6	20.1	21.8		55	157	69	11.5	18.2	19.7	21.3
16.4	17.5	19.0		45	128	58	9.7	16.2	17.2	18.6
23.4	-	-	+20	75	214	92	15.3	-	-	-
21.2	22.8	-		65	185	80	13.35	20.8	22.4	-
18.8	20.3	22.1		55	157	69	11.5	18.5	20.0	21.7
16.7	17.8	19.2		45	128	58	9.7	16.4	17.5	18.8
23.8	-	-	+40	75	214	92	15.3	23.3	-	-
21.5	23.3	-		65	185	80	13.35	21.1	22.8	-
19.2	20.7	22.5		55	157	69	11.5	18.8	20.3	22.0
16.8	18.0	19.6		45	128	58	9.7	16.6	17.7	19.2
24.2	-	-	+60	75	214	92	15.3	23.7	-	-
21.9	23.7	-		65	185	80	13.35	21.4	23.2	-
19.5	21.0	22.8		55	157	69	11.5	19.1	20.6	22.4
17.1	18.3	19.9		45	128	58	9.7	16.8	18.0	10.5
24.5	-	-	+80	75	214	92	15.3	24.0	-	-
22.2	24.0	-		65	185	80	13.35	21.7	23.5	-
19.8	21.3	21.2		55	157	69	11.5	19.4	20.9	22.7
17.3	18.6	20.2		45	128	58	9.7	17.0	18.2	19.8
24.8	-	-	+100	75	214	92	15.3	-	-	-
22.5	24.3	-		65	185	80	13.35	22.0	23.8	-
20.0	21.5	23.5		55	157	69	11.5	19.6	21.1	23.0
17.5	18.8	20.4		45	128	58	9.7	17.2	18.4	20.0

Figure 17

541. Refer to Figure 17 and assume the following conditions:

Altitude . . . . 2,000 ft.
OAT . . . . +80° F.
RPM 2500
Manifold pressure . . 24.9" Hg

What would be the approximate total flying time remaining if there were 100 lbs. of usable fuel available?

Q-03
1- 1 hour 05 minutes.
2- 1 hour 12 minutes.
3- 1 hour 24 minutes.
4- 1 hour 42 minutes.

542. Refer to Figure 17 and assume the following conditions:

Altitude . . . . 6,000 ft.
OAT . . . . +60° F.
RPM 2300
Manifold pressure . . 23.2" Hg

What would be the approximate total flying time remaining if there were 200 lbs. of usable fuel available?

Q-03
1- 2 hours 06 minutes.
2- 2 hours 30 minutes.
3- 2 hours 48 minutes.
4- 3 hours 24 minutes.

543. Refer to Figure 17 and assume the following conditions:

Altitude . . . . 4,000 ft.
OAT . . . . +80° F.
RPM 2300
Manifold pressure . . 24.0" Hg

What would be the approximate total flying time remaining if there were 350 lbs. of usable fuel available?

Q-03
1- 3 hours 48 minutes.
2- 4 hours 22 minutes.
3- 4 hours 52 minutes.
4- 5 hours 18 minutes.

544. Refer to Figure 17 and assume the following conditions:

Altitude . . . . 4,000 ft.
OAT . . . . +60° F.
RPM 2500

What manifold pressure would be required to burn 15.3 gallons of fuel per hour?

Q-03
1- 21.9" Hg.
2- 22.7" Hg.
3- 23.7" Hg.
4- 24.2" Hg.

545. Refer to Figure 17 and assume the following conditions:

Altitude . . . . 6,000 ft.
OAT . . . . +20° F.
RPM 2300

What manifold pressure would be required to burn 9.7 gallons of fuel per hour?

Q-03
1- 16.4" Hg.
2- 17.5" Hg.
3- 18.5" Hg.
4- 18.8" Hg.

546. Refer to Figure 17 and assume the following conditions:

Altitude . . . . 6,000 ft.
OAT . . . . +60° F.
RPM 2300

What manifold pressure would be required to burn 11.5 gallons of fuel per hour?

Q-03
1- 18.0" Hg.
2- 19.1" Hg.
3- 20.6" Hg.
4- 23.2" Hg.

547. Refer to Figure 17 and assume the following conditions:

Altitude . . . . sea level
OAT . . . . +40° F
RPM 2500

What manifold pressure would be required to burn 11.5 gallons of fuel per hour?

Q-03
1- 17.2" Hg.
2- 19.7" Hg.
3- 22.2" Hg.
4- 23.1" Hg.

548. Refer to Figure 17 and assume the following conditions:

Altitude . . . . 2,000 ft.
OAT . . . . +20° F.
RPM 2100

What manifold pressure would be required to burn 11.5 gallons of fuel per hour?

Q-03
1- 19.2" Hg.
2- 19.5" Hg.
3- 20.6" Hg.
4- 22.5" Hg.

CRUISE PERFORMANCE 5000

NORMAL LEAN MIXTURE

Standard Atmosphere
Zero Wind

Gross Weight - 2900 Pounds
55 Gallons - No Reserve

5000 FEET

RPM	MP	% BHP	Fuel Press.	MPH TAS	Gal/ Hour	Endurance Hours	Range Sta. Miles
2450	24	78	10.0	188	14.8	3.7	700
	23	74	9.1	183	13.9	4.0	725
	22	69	8.2	179	13.0	4.2	760
	21	65	7.5	175	12.2	4.5	790
2300	24	71	8.5	181	13.3	4.1	750
	23	67	7.8	177	12.5	4.4	780
	22	62	7.1	172	11.8	4.7	805
	21	59	6.5	168	11.1	5.0	835
2200	23	62	7.0	172	11.6	4.7	815
	22	58	6.4	168	11.0	5.0	840
	21	55	6.0	164	10.3	5.3	875
	20	51	5.5	160	9.7	5.7	905
2100	22	53	5.7	162	10.0	5.5	890
	21	50	5.3	158	9.5	5.8	915
	20	46	5.0	154	9.0	6.1	940
	19	43	4.7	149	8.5	6.5	965
	18	40	4.4	145	8.0	6.9	995
	17	37	4.2	139	7.6	7.2	1005
	16	34	4.0	133	7.1	7.8	1030
	15	31	3.8	127	6.7	8.2	1040
	14	27	3.6	118	6.3	8.7	1030

7500 CRUISE PERFORMANCE

NORMAL LEAN MIXTURE

Standard Atmosphere
Zero Wind

Gross Weight - 2900 Pounds
55 Gallons - No Reserve

7500 FEET

RPM	MP	% BHP	Fuel Press.	MPH TAS	Gal/ Hour	Endurance Hours	Range Sta. Miles
2450	22	71	8.6	186	13.4	4.1	760
	21	67	7.8	181	12.6	4.4	790
	20	63	7.2	178	11.9	4.6	820
	19	59	6.5	173	11.0	5.0	860
2300	22	64	7.4	179	12.1	4.6	815
	21	60	6.8	174	11.4	4.8	840
	20	57	6.2	170	10.7	5.1	875
	19	53	5.7	166	10.1	5.5	905
2200	22	60	6.7	174	11.4	4.8	840
	21	56	6.2	170	10.6	5.2	880
	20	53	5.7	166	10.0	5.5	910
	19	50	5.3	161	9.5	5.8	935
2100	21	51	5.6	164	9.8	5.6	920
	20	48	5.1	159	9.2	6.0	955
	19	45	4.8	155	8.7	6.3	980
	18	42	4.6	150	8.3	6.6	995
	17	39	4.3	145	7.8	7.1	1020
	16	35	4.1	139	7.3	7.5	1045
	15	32	3.9	132	6.9	8.0	1055
	14	29	3.7	124	6.5	8.5	1050

Figure 18

549. During departure when low level wind shears to an increasing headwind, aircraft performance will

Q-16 1- decrease.
2- increase.
3- remain unchanged.
4- initially decrease, then increase.

550. Which statement is true relating to the effect of low level wind shear on airplane performance?

Q-16 1- A tailwind which shears to a headwind causes an initial increase in airspeed.
2- A tailwind which shears to a headwind causes the airplane to pitch down.
3- A headwind which shears to a tailwind causes an initial increase in airspeed.
4- A headwind which shears to a tailwind causes the airplane to pitch up.

551. How will an increase in weight (loading) affect the performance of an airplane?

Q-14 1- The glide ratio will decrease.
2- The indicated stalling speeds will decrease.
3- The power settings required to produce a specific airspeed will change.
4- The lift/drag ratio will change.

552. Refer to Figure 18. Assume full fuel and 69% power on a flight at 5,000 ft. Find the flight time remaining after 2 hours 55 minutes.

Q-03 1- 1 hour 00 minutes.
2- 1 hour 06 minutes.
3- 1 hour 18 minutes.
4- 1 hour 27 minutes.

553. Refer to Figure 18. Assume full fuel and 63% power on a flight at 7,500 ft. Find the flight time remaining after 3 hours 18 minutes.

Q-03 1- 1 hour 12 minutes.
2- 1 hour 18 minutes.
3- 1 hour 22 minutes.
4- 1 hour 27 minutes.

554. Refer to Figure 18. Find the distance that can be flown at 7,500 ft. using 64% power with 36 gallons of fuel.

Q-03 1- 533 miles.
2- 541 miles.
3- 545 miles.
4- 552 miles.

555. Refer to Figure 18. Find the distance that can be flown at 5,000 ft. using 58% power with 42 gallons of fuel.

Q-03 1- 621 miles.
2- 633 miles.
3- 642 miles.
4- 656 miles.

556. Refer to Figure 18. Find the amount of fuel required to fly 740 miles at 5,000 ft. using 2300 RPM and 23" manifold pressure.

Q-03 1- 37 gallons.
2- 43 gallons.
3- 47 gallons.
4- 52 gallons.

557. Refer to Figure 18. Find the amount of fuel required to fly 558 miles at 7,500 ft. using 2200 RPM and 21" manifold pressure.

Q-03 1- 29 gallons.
2- 35 gallons.
3- 41 gallons.
4- 43 gallons.

558. Refer to Figure 18. Using the conditions given on the chart, find the RPM and manifold pressure required to fly 995 miles in 6.9 hours at an altitude of 5,000 ft.

Q-03 1- 2100 RPM and 18" Hg.
2- 2100 RPM and 20" Hg.
3- 2200 RPM and 20" Hg.
4- 2200 RPM and 22" Hg.

559. Refer to Figure 18. Using the conditions given on the chart, find the RPM and manifold pressure required to fly 955 miles in 6.0 hours at an altitude of 7,500 ft.

Q-03 1- 2100 RPM and 21" Hg.
2- 2100 RPM and 20" Hg.
3- 2200 RPM and 20" Hg.
4- 2300 RPM and 20" Hg.

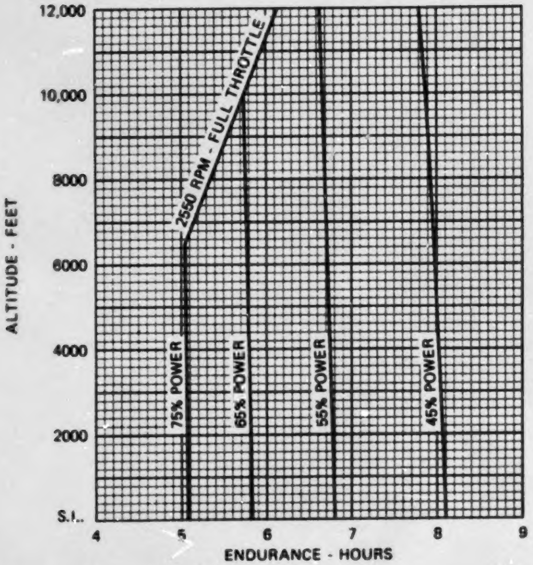
ENDURANCE PROFILE

45 MINUTES RESERVE
534 LBS. USABLE FUEL

CONDITIONS:
3800 Pounds
Recommended Lean Mixture for Cruise
Standard Temperature

NOTES:

1. This chart allows for the fuel used for engine start, taxi, takeoff and climb, and the time during a normal climb.
2. Reserve fuel is based on 45 minutes at 45% BHP and is 44 lbs.



RANGE PROFILE

45 MINUTES RESERVE
534 LBS. USABLE FUEL

CONDITIONS:
3800 Pounds
Recommended Lean Mixture for Cruise
Standard Temperature
Zero Wind

NOTES:

1. This chart allows for the fuel used for engine start, taxi, takeoff and climb, and the distance during a normal climb.
2. Reserve fuel is based on 45 minutes at 45% BHP and is 44 lbs.

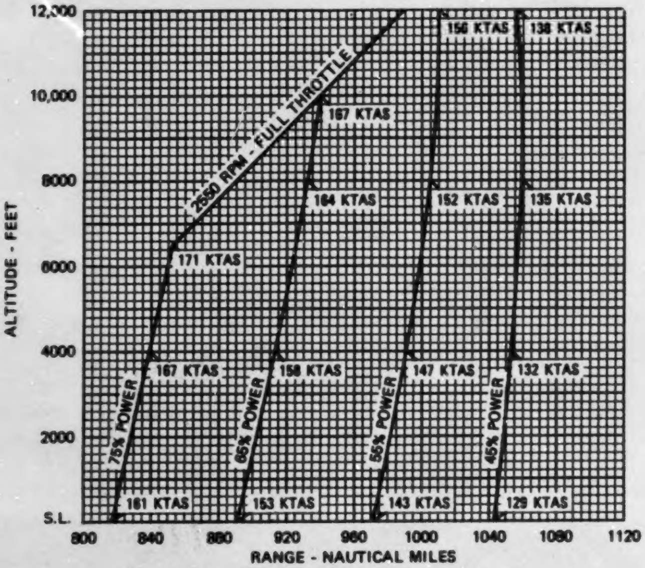


Figure 19

560. Use the conditions and data on charts in Figure 19 for computations.

Altitude . . . . 6,500 ft.
Power 45%
Headwind component . . 19 knots

The range under the conditions given is

Q-03
1- 815 NM.
2- 873 NM.
3- 905 NM.
4- 1,057 NM.

561. Use the conditions and data on charts in Figure 19 for computations.

Altitude . . . . 5,500 ft.
Power 45%
Tailwind component . . 20 knots

The range under the conditions given is

Q-03
1- 1,055 NM.
2- 1,215 NM.
3- 1,278 NM.
4- 1,303 NM.

562. Use the conditions and data on charts in Figure 19 for computations.

Altitude . . . . 10,500 ft.
Power 55%
Headwind component . . 21 knots

The range under the conditions given is

Q-03
1- 815 NM.
2- 871 NM.
3- 937 NM.
4- 1,010 NM.

563. Use the conditions and data on charts in Figure 19 for computations.

Altitude . . . . 8,500 ft.
Power 55%
Tailwind component . . 22 knots

The range under the conditions given is

Q-03
1- 957 NM.
2- 1,005 NM.
3- 1,152 NM.
4- 1,222 NM.

564. Use the conditions and data on charts in Figure 19 for computations.

Altitude . . . . 6,500 ft.
Power 55%
Headwind component . . 17 knots

The range under the conditions given is

Q-03
1- 816 NM.
2- 886 NM.
3- 943 NM.
4- 1,000 NM.

565. Use the conditions and data on charts in Figure 19 for computations.

Altitude . . . . 4,500 ft.
Power 75%
Tailwind component . . 16 knots

The range under the conditions given is

Q-03
1- 803 NM.
2- 842 NM.
3- 924 NM.
4- 973 NM.

566. Use the conditions and data on charts in Figure 19 for computations.

Altitude . . . . 5,500 ft.
Power 75%
Headwind component . . 13 knots

The range under the conditions given is

Q-03
1- 781 NM.
2- 817 NM.
3- 847 NM.
4- 876 NM.

567. Use the conditions and data on charts in Figure 19 for computations.

Altitude . . . . 6,000 ft.
Power 75%
Tailwind component . . 17 knots

The range under the conditions given is

Q-03
1- 817 NM.
2- 850 NM.
3- 937 NM.
4- 1,019 NM.

568. Use the conditions and data on charts in Figure 19 for computations.

Altitude . . . . 7,500 ft.
Power 65%
Headwind component . . 20 knots

The range under the conditions given is

Q-03
1- 773 NM.
2- 805 NM.
3- 816 NM.
4- 930 NM.

569. Use the conditions and data on charts in Figure 19 for computations.

Altitude . . . . 6,500 ft.
Power 65%
Headwind component . . 15 knots

The range under the conditions given is

Q-03
1- 817 NM.
2- 838 NM.
3- 910 NM.
4- 925 NM.

CRUISE PERFORMANCE

PRESSURE ALTITUDE 6000 FEET

CONDITIONS:
Recommended Lean Mixture
3800 Pounds
Cowl Flaps Closed

		20°C BELOW STANDARD TEMP -17°C			STANDARD TEMPERATURE 3°C			20°C ABOVE STANDARD TEMP 23°C		
RPM	MP	% BHP	KTAS	PPH	% BHP	KTAS	PPH	% BHP	KTAS	PPH
2550	24	---	---	---	78	173	97	75	174	94
	23	76	167	96	74	169	92	71	171	89
	22	72	164	90	69	166	87	67	167	84
	21	68	160	85	65	162	82	63	163	80
2500	24	78	169	98	75	171	95	73	172	91
	23	74	166	93	71	167	90	69	169	87
	22	70	162	88	67	164	85	65	165	82
	21	66	158	83	63	160	80	61	160	77
2400	24	73	165	91	70	166	88	68	167	85
	23	69	161	87	67	163	84	64	164	81
	22	65	158	82	63	159	79	61	160	77
	21	61	154	77	59	155	75	57	155	73
2300	24	68	161	86	66	162	83	64	163	80
	23	65	158	82	62	159	79	60	159	76
	22	61	154	77	59	155	75	57	155	72
	21	57	150	73	55	150	71	53	150	68
2200	24	63	156	80	61	157	77	59	158	75
	23	60	152	76	58	153	73	56	154	71
	22	57	149	72	54	149	70	53	149	67
	21	53	144	68	51	144	66	49	143	64
	20	50	139	64	48	138	62	46	137	60
	19	46	133	60	44	132	58	43	131	57

CRUISE PERFORMANCE

PRESSURE ALTITUDE 8000 FEET

CONDITIONS:
Recommended Lean Mixture
3800 Pounds
Cowl Flaps Closed

		20°C BELOW STANDARD TEMP -21°C			STANDARD TEMPERATURE -1°C			20°C ABOVE STANDARD TEMP 19°C		
RPM	MP	% BHP	KTAS	PPH	% BHP	KTAS	PPH	% BHP	KTAS	PPH
2550	22	74	169	93	71	171	90	69	172	87
	21	70	165	88	67	167	85	65	168	82
	20	66	161	82	63	162	80	61	163	77
	19	61	157	77	59	157	75	57	157	72
2500	22	72	167	90	69	169	87	67	170	84
	21	68	163	85	65	164	82	63	165	79
	20	63	159	80	61	160	77	59	160	75
	19	59	154	75	57	155	72	55	154	70
2400	22	67	163	84	65	164	81	62	165	79
	21	63	159	80	61	160	77	59	160	74
	20	59	154	75	57	155	73	55	155	70
	19	55	150	70	53	149	68	51	148	66
2300	22	63	158	79	61	159	77	59	160	74
	21	59	154	75	57	155	72	55	155	70
	20	55	150	71	53	150	68	52	149	66
	19	52	144	66	50	143	64	48	142	62
2200	22	58	153	74	56	154	71	54	153	69
	21	55	149	70	53	149	68	51	148	66
	20	51	144	66	49	143	64	48	142	62
	19	48	138	62	46	137	60	44	135	58
	18	44	131	58	43	130	56	41	128	55

Figure 20

570. Use conditions and data on appropriate chart in Figure 20 for computations.

Pressure altitude . . . . 8,000 ft.
Temperature . . . . -21° C.
Power . . 2200 RPM . . . 21" MP
Usable fuel available . . 534 lbs.

What is the maximum available flight time under the conditions stated?

Q-03
1- 7 hours 15 minutes.
2- 7 hours 37 minutes.
3- 7 hours 50 minutes.
4- 8 hours 05 minutes.

571. Use conditions and data on appropriate chart in Figure 20 for computations.

Pressure altitude . . . . 8,000 ft.
Temperature . . . . -1° C.
Power . . 2300 RPM . . . 20" MP
Usable fuel available . . 470 lbs.

What is the maximum available flight time under the conditions stated?

Q-03
1- 6 hours 11 minutes.
2- 6 hours 38 minutes.
3- 6 hours 54 minutes.
4- 7 hours 42 minutes.

572. Use conditions and data on appropriate chart in Figure 20 for computations.

Pressure altitude . . . . 8,000 ft.
Temperature . . . . 19° C.
Power . . 2400 RPM . . . 21" MP
Usable fuel available . . 490 lbs.

What is the maximum available flight time under the conditions stated?

Q-03
1- 5 hours 47 minutes.
2- 6 hours 08 minutes.
3- 6 hours 22 minutes.
4- 6 hours 38 minutes.

573. Use conditions and data on appropriate chart in Figure 20 for computation.

Pressure altitude . . . . 8,000 ft.
Temperature . . . . -1° C.
Power . . 2500 RPM . . . 21" MP
Usable fuel available . . 520 lbs.

What is the maximum available flight time under the conditions stated?

Q-03
1- 5 hours 55 minutes.
2- 6 hours 07 minutes.
3- 6 hours 20 minutes.
4- 6 hours 36 minutes.

574. Use conditions and data on appropriate chart in Figure 20 for computations.

Pressure altitude . . . . 6,000 ft.
Temperature . . . . 3° C.
Power . . 2200 RPM . . . 22" MP
Usable fuel available . . 465 lbs.

What is the maximum available flight time under the conditions stated?

Q-03
1- 6 hours 27 minutes.
2- 6 hours 39 minutes.
3- 6 hours 56 minutes.
4- 7 hours 11 minutes.

575. Use conditions and data on appropriate chart in Figure 20 for computations.

Pressure altitude . . . . 6,000 ft.
Temperature . . . . -17° C.
Power . . 2300 RPM . . . 23" MP
Usable fuel available . . 370 lbs.

What is the maximum available flight time under the conditions stated?

Q-03
1- 4 hours 20 minutes.
2- 4 hours 30 minutes.
3- 4 hours 40 minutes.
4- 4 hours 50 minutes.

576. Use conditions and data on appropriate chart in Figure 20 for computations.

Pressure altitude . . . . 6,000 ft.
Temperature . . . . -17° C.
Power . . 2400 RPM . . . 23" MP
Usable fuel available . . 505 lbs.

What is the maximum available flight time under the conditions stated?

Q-03
1- 5 hours 48 minutes.
2- 6 hours 00 minutes.
3- 6 hours 12 minutes.
4- 6 hours 21 minutes.

577. Use conditions and data on appropriate chart in Figure 20 for computations.

Pressure altitude . . . . 6,000 ft.
Temperature . . . . 23° C.
Power . . 2500 RPM . . . 23" MP
Usable fuel available . . 460 lbs.

What is the maximum available flight time under the conditions stated?

Q-03
1- 4 hours 46 minutes.
2- 4 hours 58 minutes.
3- 5 hours 07 minutes.
4- 5 hours 17 minutes.

WIND COMPONENTS

EXAMPLE:

WIND SPEED	10 KNOTS
ANGLE BETWEEN WIND DIRECTION AND FLIGHT PATH	20°
HEADWIND COMPONENT	9.5 KNOTS
CROSSWIND COMPONENT	3.5 KNOTS

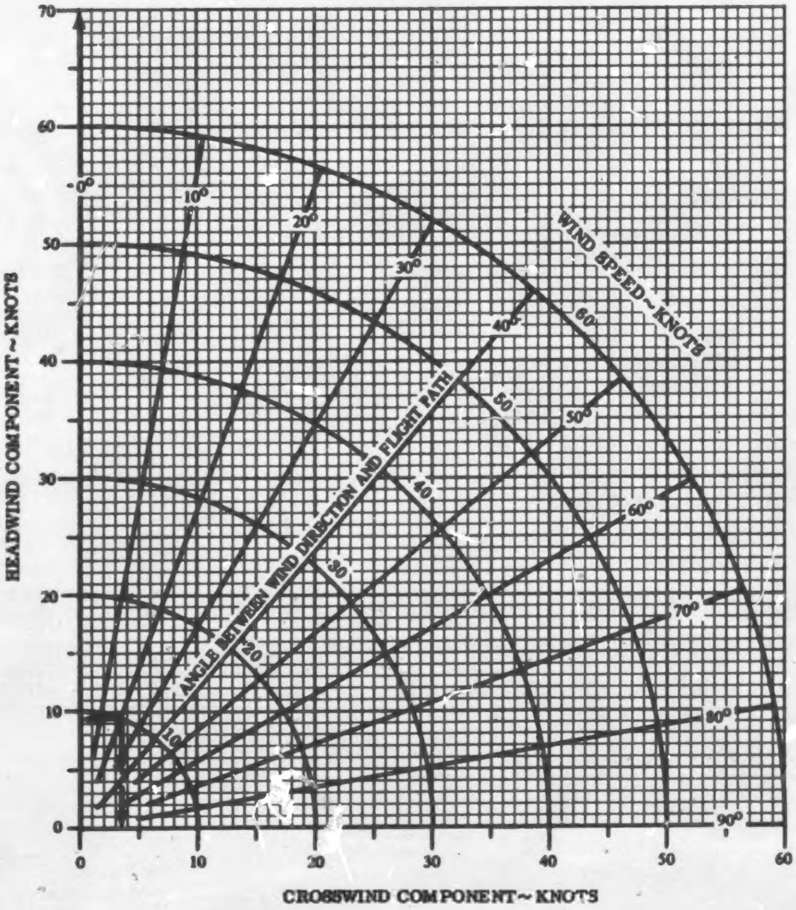


Figure 21

578. Assume the following conditions exist at an airport of intended landing:

Landing runway . . . 30
Wind . . . . 020° @ 15 knots

Using the chart in Figure 21, a pilot can determine that the crosswind component is approximately

Q-04
1- 4 knots.
2- 15 knots.
3- 20 knots.
4- 22 knots.

579. Assume the following conditions exist at an airport of intended landing:

Landing runway . . . 3
Wind . . . . 060° @ 35 knots

Using the chart in Figure 21, a pilot can determine that the crosswind component is approximately

Q-04
1- 10 knots.
2- 12 knots.
3- 18 knots.
4- 22 knots.

580. Assume the following conditions exist at an airport of intended landing:

Landing runway . . . 13
Wind . . . . 140° @ 30 knots

Using the chart in Figure 21, a pilot can determine that the crosswind component is approximately

Q-04
1- 5 knots.
2- 10 knots.
3- 15 knots.
4- 18 knots.

581. Assume the following conditions exist at an airport of intended landing:

Landing runway . . . 22
Wind . . . . 260° @ 23 knots

Using the chart in Figure 21, a pilot can determine that the crosswind component is approximately

Q-04
1- 10 knots.
2- 15 knots.
3- 20 knots.
4- 25 knots.

582. Assume a maximum demonstrated crosswind component equal to 0.2 Vso, and the following conditions exist at an airport of intended landing:

Vso . . . . 70 knots
Landing runway . . 35
Wind . . . . 300° @ 20 knots

Using the chart in Figure 21, a pilot can determine that the

Q-04
1- headwind component exceeds the crosswind component.

2- headwind component is excessive.

3- crosswind component is within safe limits.

4- maximum safe crosswind component is exceeded.

583. Assume a maximum demonstrated crosswind component equal to 0.2 Vso, and the following conditions exist at an airport of intended landing:

Vso . . . . 60 knots
Landing runway . . 12
Wind . . . . 150° @ 20 knots

Using the chart in Figure 21, a pilot can determine that the

Q-04
1- crosswind component exceeds the headwind component.

2- headwind component is excessive.

3- crosswind component is within safe limits.

4- maximum safe crosswind component is exceeded.

584. Assume a maximum demonstrated crosswind component equal to 0.2 Vso, and the following conditions exist at an airport of intended landing:

Vso . . . . 65 knots
Landing runway . . 17
Wind . . . . 200° @ 30 knots

Using the chart in Figure 21, a pilot can determine that the

Q-04
1- crosswind component exceeds the headwind component.

2- maximum safe crosswind component is exceeded.

3- crosswind component is within safe limits.

4- headwind component is excessive.

LANDING DISTANCE

CONDITIONS:
Flaps 30°
Power Off
Maximum Braking
Paved, Level, Dry Runway
Zero Wind

NOTES:

1. Decrease distances 10% for each 10 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2.5 knots.
2. For operation on a dry, grass runway, increase distances by 40% of the "ground roll" figure.

WEIGHT LBS	SPEED AT 50 FT KIAS	PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
			GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS
3800	71	S.L.	725	1440	750	1480	780	1520	805	1560	830	1600
		1000	750	1480	780	1520	805	1560	835	1605	860	1645
		2000	780	1525	810	1565	835	1605	865	1650	895	1695
		3000	810	1565	840	1610	870	1660	900	1705	930	1750
		4000	840	1615	870	1660	900	1705	930	1750	965	1800
		5000	870	1660	905	1710	935	1755	965	1805	1000	1855
		6000	905	1710	940	1765	970	1810	1005	1860	1035	1910
		7000	940	1765	975	1815	1010	1870	1045	1920	1075	1970
		8000	975	1815	1010	1870	1050	1930	1085	1980	1120	2035

Figure 22

585. Use Figure 22 to determine ground roll under the following conditions:

Weight	3,800 lbs.
Pressure altitude	7,000 ft.
Temperature	20° C.
Tailwind	5 knots
Runway length (paved)	1,100 ft.

Is the runway length sufficient for landing?

Q-06
1- Yes, only 808 ft. are needed.
2- Yes, only 1,010 ft. are needed.
3- No, 1,212 ft. are needed.
4- No, 1,496 ft. are needed.

586. Use Figure 22 to determine ground roll under the following conditions:

Weight	3,800 lbs.
Pressure altitude	5,000 ft.
Temperature	10° C.
Tailwind	10 knots
Runway length (paved)	1,200 ft.

Is the runway length sufficient for landing?

Q-06
1- Yes, only 905 ft. are needed.
2- Yes, only 1,086 ft. are needed.
3- No, 1,267 ft. are needed.
4- No, 1,710 ft. are needed.

587. Use Figure 22 to determine ground roll under the following conditions:

Weight	3,800 lbs.
Pressure altitude	4,000 ft.
Temperature	40° C.
Headwind	10 knots
Runway length (paved)	1,000 ft.

Is the runway length sufficient for landing?

Q-06
1- Yes, only 868 ft. are needed.
2- Yes, only 965 ft. are needed.
3- No, 1,061 ft. are needed.
4- No, 1,620 ft. are needed.

588. Use Figure 22 to determine ground roll under the following conditions:

Weight	3,800 lbs.
Pressure altitude	3,000 ft.
Temperature	30° C.
Headwind	12 knots
Runway length (paved)	1,000 ft.

Is the runway length sufficient for a landing?

Q-06
1- Yes, only 792 ft. are needed.
2- Yes, only 900 ft. are needed.
3- No, 1,008 ft. are needed.
4- No, 1,597 ft. are needed.

589. Use Figure 22 to determine landing distance under the following conditions:

Weight	3,800 lbs.
Pressure altitude	6,000 ft.
Temperature	30° C.
Tailwind	5 knots
Runway length (paved)	2,500 ft.

Is the distance sufficient to land with a 50-foot obstruction at the threshold?

Q-06
1- Yes, only 1,046 ft. are needed.
2- Yes, only 1,488 ft. are needed.
3- Yes, only 1,860 ft. are needed.
4- Yes, only 2,232 ft. are needed.

590. Use Figure 22 to determine landing distance under the following conditions:

Weight	3,800 lbs.
Pressure altitude	5,000 ft.
Temperature	20° C.
Tailwind	5 knots
Runway length (paved)	2,000 ft.

Is the distance sufficient to land with a 50-foot obstruction at the threshold?

Q-06
1- Yes, only 1,404 ft. are needed.
2- Yes, only 1,755 ft. are needed.
3- No, 2,106 ft. are needed.
4- No, 2,320 ft. are needed.

591. Use Figure 22 to determine landing distance under the following conditions:

Weight	3,800 lbs.
Pressure altitude	4,000 ft.
Temperature	20° C.
Headwind	18 knots
Runway length (paved)	1,500 ft.

Is the distance sufficient to land with a 50-foot obstruction at the threshold?

Q-06
1- Yes, only 1,220 ft. are needed.
2- Yes, only 1,398 ft. are needed.
3- Yes, only 1,425 ft. are needed.
4- No, 1,705 ft. are needed.

592. Use Figure 22 to determine landing distance under the following conditions:

Weight	3,800 lbs.
Pressure altitude	2,000 ft.
Temperature	30° C.
Headwind	16 knots
Runway length (paved)	1,500 ft.

Is the distance sufficient to land with a 50-foot obstruction at the threshold?

Q-06
1- Yes, only 1,050 ft. are needed.
2- Yes, only 1,386 ft. are needed.
3- No, 1,590 ft. are needed.
4- No, 1,650 ft. are needed.

OBSTACLE LANDING

ASSOCIATED CONDITIONS:

POWER	AS REQUIRED TO MAINTAIN 800 FT/MIN DESCENT ON APPROACH
FLAPS	DOWN
GEAR	DOWN
RUNWAY	PAVED, LEVEL, DRY SURFACE
APPROACH SPEED	IAS AS TABULATED
BRAKING	MAXIMUM

NOTE: GROUND ROLL IS APPROX. 55% OF TOTAL LANDING DISTANCE OVER A 50 FT OBSTACLE.

EXAMPLE:

OAT	70° F.
PRESSURE ALTITUDE	2000 FT
LANDING WEIGHT	3000 LBS
HEAD WIND	10 KNOTS
TOTAL LANDING DISTANCE OVER A 50 FT OBSTACLE	1000 FT
GROUND ROLL (55% OF 1000)	550 FT
IAS APPROACH SPEED	76 MPH

WEIGHT POUNDS	IAS APPROACH SPEED (ASSUMES ZERO INSTR. ERROR)	
	MPH	KNOTS
3400	80	76
3200	78	68
3000	76	66
2800	73	63
2600	70	61
2400	67	58

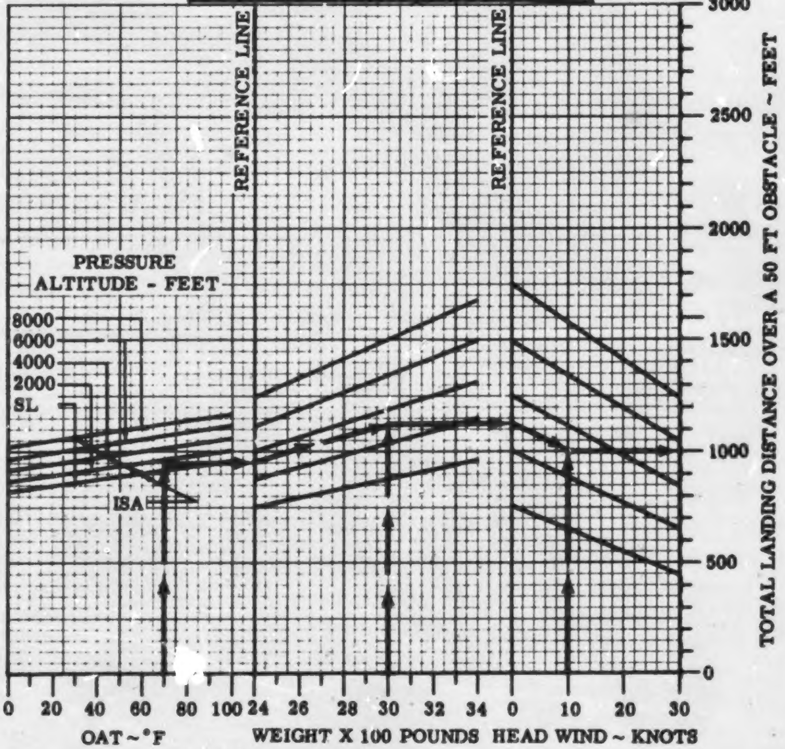


Figure 23

593. Use Figure 23.

GIVEN: Associated Conditions . Fig. 23
Temperature . . . . . . 75° F.
Pressure altitude . . . 4,000 ft.
Weight . . . . 3,300 lbs.
Headwind . . . . 12 knots

Under the conditions given, determine the approximate ground roll.

Q-06
1- 408 feet.
2- 464 feet.
3- 530 feet.
4- 633 feet.

594. Use Figure 23.

GIVEN: Associated Conditions . Fig. 23
Temperature . . . . . . 85° F.
Pressure altitude . . . 6,000 ft.
Weight . . . . 3,000 lbs.
Headwind . . . . 18 knots

What is the total landing distance over a 50-foot obstacle?

Q-06
1- 850 feet.
2- 975 feet.
3- 1,075 feet.
4- 1,180 feet.

595. Use Figure 23.

GIVEN: Associated Conditions . Fig. 23
Temperature . . . . . . 80° F.
Pressure altitude . . . 8,000 ft.
Weight . . . . 2,900 lbs.
Headwind . . . . 24 knots

Under the conditions given, determine the approximate ground roll.

Q-06
1- 400 feet.
2- 450 feet.
3- 550 feet.
4- 650 feet.

596. Use Figure 23.

GIVEN: Associated Conditions . Fig. 23
Temperature . . . . . . 90° F.
Pressure altitude . . . 8,000 ft.
Weight . . . . 3,400 lbs.
Headwind . . . . 30 knots

What is the total landing distance over a 50-foot obstacle?

Q-06
1- 1,100 feet.
2- 1,175 feet.
3- 1,250 feet.
4- 1,300 feet.

597. Use Figure 23.

GIVEN: Associated Conditions . Fig. 23
Temperature . . . . . . 70° F.
Pressure altitude . . . 6,000 ft.
Weight . . . . 3,300 lbs.
Headwind . . . . 28 knots

Under the conditions given, determine the approximate ground roll.

Q-06
1- 475 feet.
2- 550 feet.
3- 625 feet.
4- 1,000 feet.

598. Use Figure 23.

GIVEN: Associated Conditions . Fig. 23
Temperature . . . . . . 60° F.
Pressure altitude . . . 4,000 ft.
Weight . . . . 3,200 lbs.
Headwind . . . . 20 knots

What is the total landing distance over a 50-foot obstacle?

Q-06
1- 850 feet.
2- 975 feet.
3- 1,050 feet.
4- 1,125 feet.

599. Use Figure 23.

GIVEN: Associated Conditions . Fig. 23
Temperature . . . . . . 50° F.
Pressure altitude . . . 2,000 ft.
Weight . . . . 3,100 lbs.
Headwind . . . . 16 knots

Under the conditions given, determine the approximate ground roll.

Q-06
1- 493 feet.
2- 523 feet.
3- 678 feet.
4- 950 feet.

600. Use Figure 23.

GIVEN: Associated Conditions . Fig. 23
Temperature . . . . . . 40° F.
Pressure altitude . . . sea level
Weight . . . . 2,800 lbs.
Headwind . . . . 8 knots

What is the total landing distance over a 50-foot obstacle?

Q-06
1- 750 feet.
2- 850 feet.
3- 950 feet.
4- 1,050 feet.

NORMAL LANDING

ASSOCIATED CONDITIONS:

POWER	AS REQUIRED TO MAINTAIN 800 FT/MIN DESCENT ON APPROACH
FLAPS	DOWN
RUNWAY	PAVED, LEVEL, DRY SURFACE
APPROACH SPEED	IAS AS TABULATED

NOTE: GROUND ROLL IS APPROX. 53% OF TOTAL LANDING DISTANCE OVER A 50 FT OBSTACLE.

EXAMPLE:

OAT	75° F.
PRESSURE ALTITUDE	4000 FT
LANDING WEIGHT	3200 LBS
HEAD WIND	10 KNOTS
TOTAL LANDING DISTANCE OVER A 50 FT OBSTACLE	1475 FT
GROUND ROLL (53% OF 1475)	782 FT
IAS APPROACH SPEED	87 MPH IAS

WEIGHT POUNDS	IAS APPROACH SPEED (ASSUMES ZERO INSTR. ERROR)	
	MPH	KNOTS
3400	90	78
3200	87	76
3000	84	73
2800	81	70
2600	78	68
2400	75	65

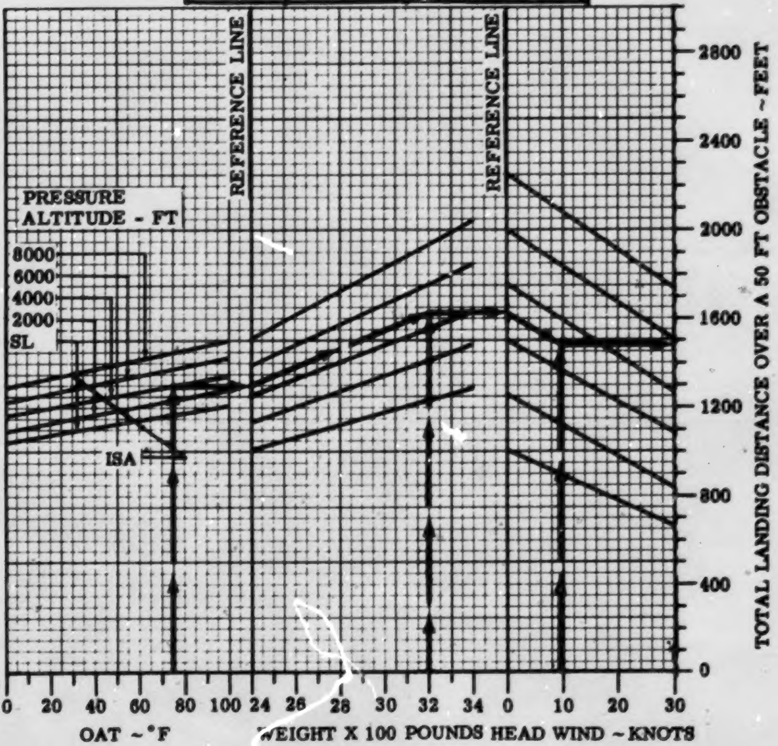


Figure 24

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601. Use Figure 24.

GIVEN: Associated Conditions . Fig. 24
Temperature . . . . . . 70° F.
Pressure altitude . . . sea level
Weight . . . . 3,400 lbs.
Headwind . . . . 16 knots

Under the conditions given, determine the approximate ground roll.

Q-06
1- 542 feet.
2- 676 feet.
3- 883 feet.
4- 1,275 feet.

602. Use Figure 24.

GIVEN: Associated Conditions . Fig. 24
Temperature . . . . . . 80° F.
Pressure altitude . . . 4,000 ft.
Weight . . . . 2,800 lbs.
Headwind . . . . 24 knots

What is the total landing distance over a 50-foot obstacle?

Q-06
1- 1,000 feet.
2- 1,125 feet.
3- 1,250 feet.
4- 1,325 feet.

603. Use Figure 24.

GIVEN: Associated Conditions . Fig. 24
Temperature . . . . . . 50° F.
Pressure altitude . . . sea level
Weight . . . . 3,000 lbs.
Headwind . . . . 20 knots

Under the conditions given, determine the approximate ground roll.

Q-06
1- 425 feet.
2- 557 feet.
3- 836 feet.
4- 1,050 feet.

604. Use Figure 24.

GIVEN: Associated Conditions . Fig. 24
Temperature . . . . . . 90° F.
Pressure altitude . . . 8,000 ft.
Weight . . . . 3,400 lbs.
Headwind . . . . 6 knots

What is the total landing distance over a 50-foot obstacle?

Q-06
1- 1,700 feet.
2- 1,750 feet.
3- 1,825 feet.
4- 1,900 feet.

605. Use Figure 24.

GIVEN: Associated Conditions . Fig. 24
Temperature . . . . . . 60° F.
Pressure altitude . . . 8,000 ft.
Weight . . . . 3,200 lbs.
Headwind . . . . 18 knots

Under the conditions given, determine the approximate ground roll.

Q-06
1- 650 feet.
2- 795 feet.
3- 1,050 feet.
4- 1,500 feet.

606. Use Figure 24.

GIVEN: Associated Conditions . Fig. 24
Temperature . . . . . . 90° F.
Pressure altitude . . . 2,000 ft.
Weight . . . . 3,400 lbs.
Headwind . . . . 10 knots

What is the total landing distance over a 50-foot obstacle?

Q-06
1- 1,475 feet.
2- 1,575 feet.
3- 1,650 feet.
4- 1,725 feet.

607. Use Figure 24.

GIVEN: Associated Conditions . Fig. 24
Temperature . . . . . . 85° F.
Pressure altitude . . . 6,000 ft.
Weight . . . . 2,800 lbs.
Headwind . . . . 14 knots

Under the conditions given, determine the approximate ground roll.

Q-06
1- 634 feet.
2- 742 feet.
3- 1,280 feet.
4- 1,480 feet.

608. Use Figure 24.

GIVEN: Associated Conditions . Fig. 24
Temperature . . . . . . 50° F.
Pressure altitude . . . 4,000 ft.
Weight . . . . 3,000 lbs.
Headwind . . . . 22 knots

What is the total landing distance over a 50-foot obstacle?

Q-06
1- 975 feet.
2- 1,050 feet.
3- 1,175 feet.
4- 1,250 feet.

STALL SPEEDS (IAS)

ANGLE OF BANK

GROSS WEIGHT 3400 LBS.	LEVEL	20°	40°	60°
POWER	GEAR AND FLAPS UP			
ON	61 mph (53 kts)	63 mph (55 kts)	71 mph (61 kts)	86 mph (75 kts)
OFF	74 mph (64 kts)	76 mph (66 kts)	86 mph (74 kts)	105 mph (91 kts)
	GEAR AND FLAPS DOWN			
ON	50 mph (44 kts)	52 mph (45 kts)	58 mph (51 kts)	71 mph (62 kts)
OFF	63 mph (55 kts)	65 mph (57 kts)	73 mph (64 kts)	89 mph (78 kts)

Figure 25

609. Refer to the chart in Figure 25. In a 20° bank, the power-on stall speed with gear and flaps down is approximately

Q-08
1- 45 knots.
2- 55 knots.
3- 57 knots.
4- 66 knots.

610. Refer to the chart in Figure 25. In a 40° bank, the power-on stall speed with gear and flaps up is approximately

Q-08
1- 61 knots.
2- 64 knots.
3- 71 knots.
4- 74 knots.

611. According to the chart in Figure 25, Vso in a 20° bank would be approximately

Q-08
1- 45 knots.
2- 55 knots.
3- 57 knots.
4- 66 knots.

612. According to the chart in Figure 25, Vso in a 40° bank would be approximately

Q-08
1- 51 knots.
2- 61 knots.
3- 64 knots.
4- 74 knots.

613. According to the chart in Figure 25, Vso in a 60° bank would be approximately

Q-08
1- 62 knots.
2- 75 knots.
3- 78 knots.
4- 91 knots.

614. According to the chart in Figure 25, Vso in a 40° bank would be approximately

Q-08
1- 58 MPH.
2- 61 MPH.
3- 71 MPH.
4- 73 MPH.

615. According to the chart in Figure 25, Vso in a 20° bank would be approximately

Q-08
1- 45 MPH.
2- 55 MPH.
3- 65 MPH.
4- 76 MPH.

616. According to the chart in Figure 25, Vso in a 60° bank would be approximately

Q-08
1- 71 MPH.
2- 75 MPH.
3- 89 MPH.
4- 105 MPH.

617. Which of the following will occur if the indicated airspeed is constant and the density altitude increases?

Q-13

1- True airspeed will decrease, and groundspeed will increase.
2- True airspeed will decrease, and groundspeed will decrease.
3- True airspeed will increase, and groundspeed will decrease.
4- True airspeed will increase, and groundspeed will increase.

618. The primary reason for computing density altitude is to

Q-13

1- determine pressure altitude.
2- ensure safe cruising altitude over mountainous terrain.
3- determine aircraft performance.
4- establish flight levels above 18,000 feet MSL.

619. Assuming that atmospheric pressure and temperature remain the same, a decrease in humidity will result in a

Q-13

1- shorter takeoff distance; the air is less dense.
2- longer takeoff distance; the air is more dense.
3- shorter takeoff distance; the air is more dense.
4- longer takeoff distance; the air is less dense.

620. An increase in humidity in the atmosphere will tend to

Q-13

1- increase the rate of climb.
2- decrease the takeoff distance.
3- increase the landing roll.
4- decrease the landing groundspeed.

621. If the atmospheric pressure and temperature remain the same, how would an increase in humidity affect takeoff performance?

Q-13

1- Shorter takeoff distance; the air is less dense.
2- Longer takeoff distance; the air is more dense.
3- Longer takeoff distance; the air is less dense.
4- Shorter takeoff distance; the air is more dense.

622. The highest indicated airspeed will be obtained during level flight at a constant power setting when the outside air is

Q-13

1- cold and dry.
2- warm and moist.
3- warm and dry.
4- cold and moist.

623. Suppose at sea level an unsupercharged engine with a constant-speed propeller develops 260 HP at 2625 RPM and 29" Hg. Which power settings would be expected at an airport where the elevation is 5,000 feet above sea level?

Q-13

1- Less than 2625 RPM and 29" Hg.
2- 2625 RPM and less than 29" Hg.
3- More than 2625 RPM and more than 29" Hg.
4- 2625 RPM and 29" Hg.

624. How does high density altitude affect the takeoff performance of an airplane?

Q-13

1- Increased drag will require more power for acceleration.
2- Reduced engine and propeller efficiency will decrease acceleration.
3- Reduced drag will increase the rate of acceleration.
4- A higher indicated airspeed is required to produce necessary lift.

625. Suppose that on takeoff at sea level, full power with an unsupercharged engine will produce a manifold pressure of approximately 30" Hg. After climbing to 10,000 feet, without changing the position of the engine controls, the manifold pressure gauge would indicate approximately

Q-13

1- 15" Hg.
2- 20" Hg.
3- 30" Hg.
4- 39" Hg.

626. Suppose that on takeoff at sea level, full power with an unsupercharged engine will produce a manifold pressure of approximately 27" Hg. After climbing to 5,000 feet, without changing the position of the engine controls, the manifold pressure gauge would indicate approximately

Q-13

1- 30" Hg.
2- 27" Hg.
3- 22" Hg.
4- 20" Hg.

627. Comparing the indicated stalling speed and true airspeed at 5,000 feet MSL with that at sea level, the indicated stalling speed will normally be

Q-13
1- the same as at sea level, but the true airspeed will be higher.
2- higher than at sea level, but the true airspeed will be the same.
3- the same as at sea level and the true airspeed will be the same.
4- higher than at sea level and the true airspeed will be higher.

628. What would occur if the density altitude is 5,000 feet at an airport where the field elevation is 2,000 feet?

Q-13
1- Takeoff and landing performance would not be affected.
2- The altimeter would indicate 5,000 feet when the airplane is on the ground.
3- Takeoff and landing performance would be the same as an airport with an elevation of 5,000 feet.
4- The indicated takeoff and landing airspeed should be higher than on a standard day.

629. Assume an approach speed of 1.3 to 1.4 times Vso when landing at an airport that is 6,500 feet above sea level. If landing this airplane at a sea level airport, the indicated approach speed should be

Q-13
1- faster than at 6,500 feet.
2- the same as at 6,500 feet.
3- Vso with the flaps fully extended.
4- slower than at 6,500 feet.

630. Assume that an airplane is flying at a constant power setting and at a constant indicated altitude. If the outside air temperature increases, the true airspeed will

Q-13
1- decrease; the true altitude will increase.
2- increase; the true altitude will decrease.
3- increase; the true altitude will increase.
4- decrease; the true altitude will decrease.

631. For a given indicated airspeed, a high density altitude will always result in

Q-13
1- an increase in equivalent airspeed.
2- an increase in true airspeed.
3- a decrease in true airspeed.
4- an increase in calibrated airspeed.

632. Assume comparable conditions relative to temperature, wind, and airplane weight. The groundspeed at touchdown at high elevation airports will be

Q-13
1- higher than at sea level.
2- lower than at sea level.
3- the same as at sea level.
4- either higher or lower than at sea level, depending on airspeed corrections applied.

633. If 80 MPH indicated airspeed has been used on final approach at an airport at sea level, the indicated airspeed on final approach to an airport where the field elevation is 4,800 feet MSL should be

Q-13
1- lower because the true airspeed is higher.
2- higher because the stalling speed is higher.
3- lower because the air density is lower.
4- the same as at sea level fields.

634. Assume a calm wind. During approach and landing at a high elevation airport and using the same indicated airspeed as that used at a sea level airport, the

Q-13
1- groundspeed will be higher and the landing distance will be greater at the higher elevation airport.
2- groundspeed will be the same and the landing distance will be the same at each of the airports.
3- true airspeed will be the same and the landing distance will be the same at both airports.
4- true airspeed will be lower and the landing distance will be less at the higher elevation airport.

635. Which statement is true regarding the maximum distance attained over the ground in event of engine failure under a no-wind condition?

Q-14
1- The glide ratio for an airplane is a fixed value and does not change regardless of weight or speed.
2- A change in airplane weight would not require a change in the maximum distance glide speed.
3- A decrease in airplane weight would require a decrease in the maximum distance glide speed.
4- A decrease in airplane weight would require an increase in the maximum distance glide speed.

636. In light airplanes, normal recovery from spins may become difficult if the

Q-14
1- CG is too far rearward.
2- spin is entered too rapidly.
3- CG is too far forward.
4- airspeed becomes too great.

637. The indicated stalling speed of an airplane is most affected by

Q-14
1- variations in airplane loading.
2- variations in flight altitude.
3- changes in air density.
4- changes in air temperature.

638. If fuel/air mixture adjustments are not made during high altitude operation, engine performance will be affected because of

Q-13
1- a constant volume of air while there is an increase in the amount of fuel entering the carburetor.
2- a decrease in the weight of air and amount of fuel entering the carburetor.
3- a decrease in the weight of air while the same amount of fuel enters the carburetor.
4- a decrease in the volume of air while there is an increase in the amount of fuel entering the carburetor.

639. If an airplane is loaded to the rear of the CG range, that airplane will tend to become

Q-14
1- sluggish in rudder control.
2- unstable about its longitudinal axis.
3- sluggish in aileron control.
4- unstable about its lateral axis.

640. Density altitude is used to determine

Q-13
1- absolute altitude.
2- performance capability of an aircraft.
3- terrain clearance in mountainous areas.
4- true altitude.

641. As air density decreases, density altitude

Q-13
1- increases when the temperature decreases.
2- decreases when the temperature increases.
3- decreases.
4- increases.

642. What effect does the combination of high humidity and high temperature have on density altitude?

Q-13
1- High humidity tends to increase density altitude while high temperature tends to decrease density altitude.
2- High humidity tends to decrease density altitude while high temperature tends to increase density altitude.
3- Increases density altitude.
4- Decreases density altitude.

643. As air density increases, density altitude

Q-13
1- decreases only when the temperature increases.
2- increases when the temperature decreases.
3- decreases.
4- increases.

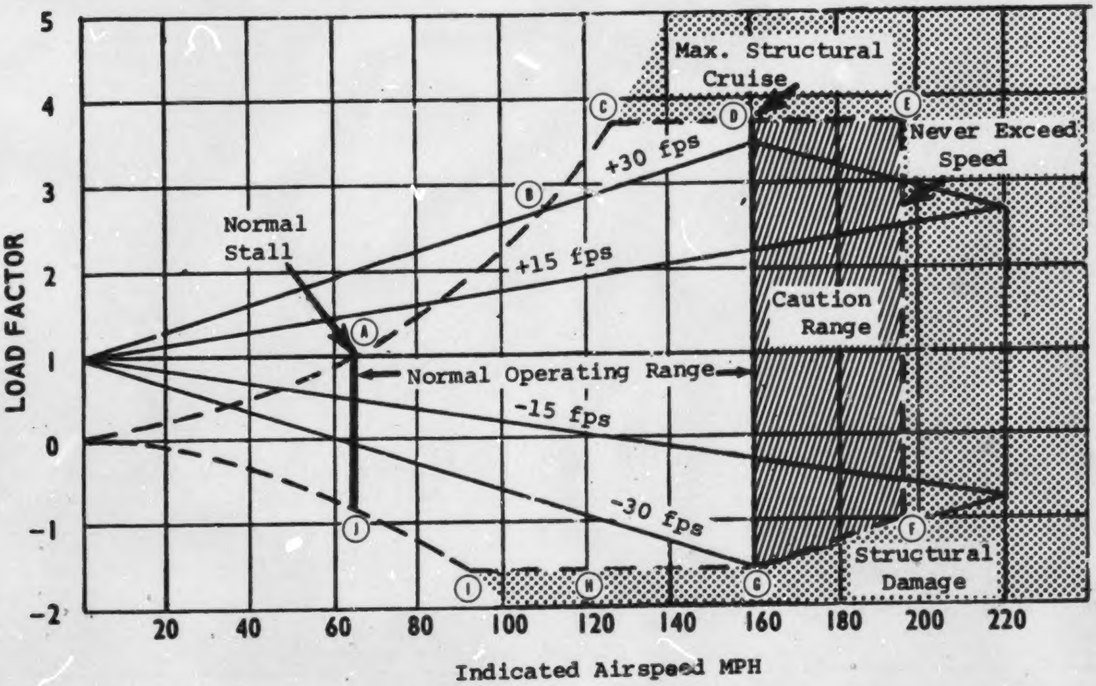

Figure 26

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644. Refer to Figure 26. The vertical line from point D to G is represented on the airspeed indicator by the

Q-15
- 1- maximum speed limit of the green arc.
- 2- maximum speed limit of the yellow arc.
- 3- maximum speed limit of the white arc.
- 4- minimum speed limit of the green arc.

645. Refer to Figure 26. The area bounded by points D, E, F, and G is represented on the airspeed indicator by the

Q-15
- 1- green arc.
- 2- white arc.
- 3- yellow arc.
- 4- red line.

646. Refer to Figure 26. The horizontal dashed line from point C to E represents the

O-17
- 1- maximum structural cruise airspeed range.
- 2- positive limit load factor.
- 3- airspeed range for normal operations.
- 4- ultimate load factor.

647. Refer to Figure 26. What load factor would be created if positive 30 foot per second gusts were encountered at 130 MPH?

O-17
- 1- 1.8.
- 2- 2.0.
- 3- 3.0.
- 4- 3.8.

648. Refer to Figure 26. The vertical line from point E to F is represented on the airspeed indicator by the

Q-15
- 1- yellow arc.
- 2- red line.
- 3- green arc.
- 4- white arc.

649. Refer to Figure 26. A positive load factor of 3 at 100 MPH would cause the airplane to

O-17
- 1- climb at a steady rate.
- 2- be subjected to structural damage.
- 3- break apart.
- 4- stall.

650. Refer to Figure 26. A positive load factor of 4 at 140 MPH would cause the airplane to

O-17
- 1- climb at a steady rate.
- 2- be subjected to structural damage.
- 3- break apart.
- 4- stall.

651. Refer to Figure 26. A positive load factor of 4 at 160 MPH would cause the airplane to

O-17
- 1- be subjected to structural damage.
- 2- climb at a steady rate.
- 3- break apart.
- 4- stall.

652. During an approach, the most important and easily recognized means of being alerted to possible wind shear is monitoring the

Q-16
- 1- heading changes necessary to remain on the runway center line.
- 2- increasing trend in the severity of turbulence as the aircraft approaches the surface.
- 3- amount of trim required to relieve control pressures.
- 4- power and vertical velocity required to remain on the proper glidepath.

653. As the center of gravity location is changed, recovery from stalls becomes progressively

Q-14
- 1- less difficult as the CG moves rearward.
- 2- more difficult as the CG moves forward.
- 3- less difficult as the CG moves either forward or rearward.
- 4- more difficult as the CG moves rearward.

654. Stall recovery becomes progressively more difficult if the center of gravity is located further

Q-14
- 1- forward in light airplanes only.
- 2- aft in any airplane.
- 3- aft in light airplanes only.
- 4- forward in any airplane.

655. Which statement concerning airplane speed symbols is correct?

Q-15
1- Vx is the best rate-of-climb speed.
2- Vle is the minimum landing safety speed.
3- Va is the design maneuvering speed.
4- Vso is the power-on stalling speed with the gear and flaps retracted.

656. The maximum speed at which an airplane may be safely stalled is the

Q-15
1- power-off stalling speed with the gear and flaps in the landing position.
2- never-exceed speed.
3- maximum structural cruising speed.
4- maneuvering speed.

657. "Maximum structural cruising speed" is the maximum speed at which an airplane can be operated during

Q-15
1- operations with gear extended.
2- abrupt maneuvers.
3- normal operations.
4- flight in smooth air.

658. Which airspeed listed below would a pilot be unable to identify by color-coding on the airspeed indicator?

Q-15
1- The maneuvering speed.
2- The power-off stalling speed with the wing flaps and landing gear retracted.
3- The maximum structural cruising speed.
4- The never-exceed speed.

659. In the event severe turbulence is inadvertently encountered, the airplane should be flown at or below

Q-15
1- maximum structural cruising speed.
2- any speed within the range of the green arc.
3- a speed equal to 1.2 times Vso.
4- maneuvering speed.

660. To attain maximum gliding distance after engine failure, the most efficient airspeed to use is the

Q-15
1- speed within the green arc as depicted on the airspeed indicator.
2- speed just above stall.
3- maximum lift over drag (L/D) speed, considering gross weight.
4- maximum structural cruising speed.

661. Which marking is shown on the airspeed indicators of single-engine airplanes?

Q-15
1- A red line showing Vne.
2- A yellow line showing Vso.
3- A blue line showing Vle.
4- A red line showing Vse.

662. The upper airspeed limit of the green arc on the airspeed indicator represents the maximum

Q-15
1- structural cruising speed (Vno).
2- landing gear lowering speed (Vle).
3- design maneuvering speed (Va).
4- allowable speed for smooth-air operations (Vne).

663. How does increased weight affect the takeoff distance of an airplane?

Q-14
1- Every airplane has the same acceleration factor under the same atmospheric conditions, but a higher airspeed is needed to produce the additional lift required.
2- Every airplane has the same acceleration factor with the same power output, but a higher airspeed is needed to overcome the increased ground effect.
3- The airplane will accelerate more slowly with the same power output and a higher airspeed is required to generate necessary lift for takeoff.
4- The airplane will accelerate more slowly with the same power output, but the same airspeed is required to generate necessary lift for takeoff.

GLIDE DISTANCE

ASSOCIATED CONDITIONS:

GEAR	UP
FLAPS	UP
COWL FLAPS	CLOSED
PROPELLER	FULL HIGH PITCH (LOW RPM)
GLIDE SPEED	22 MPH IAS

NOTES 1. INCREASE GLIDE DISTANCE APPROXIMATELY
0% FOR EACH 10 KNOTS OF TAIL WIND.
2. DECREASE GLIDE DISTANCE APPROXIMATELY
0% FOR EACH 10 KNOTS OF HEADWIND

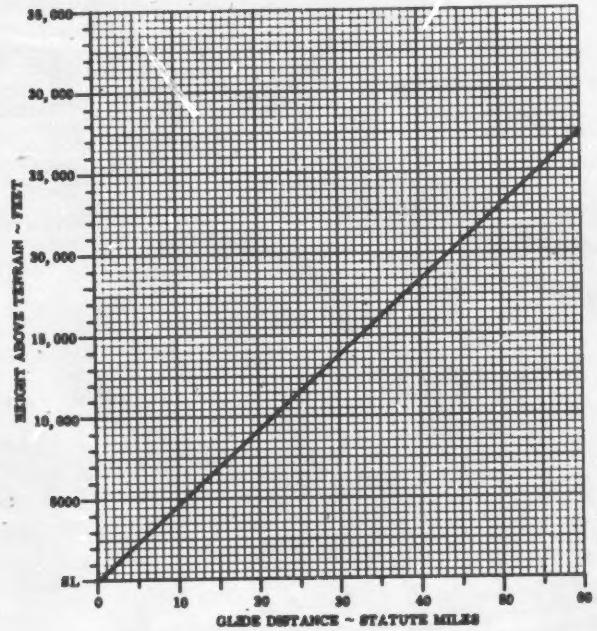


Figure 27

664. Refer to Figure 27 above.

GIVEN: Associated Conditions . Fig. 27
Height above terrain . 5,500 ft.
Tailwind . . . . 10 knots

What is the approximate glide distance?

Q-16 1- 10 miles.
2- 11 miles.
3- 12 miles.
4- 13 miles.

665. Refer to Figure 27 above.

GIVEN: Associated Conditions . Fig. 27
Height above terrain . 10,500 ft.
Tailwind . . . . 20 knots

What is the approximate glide distance?

Q-16 1- 22 miles.
2- 24 miles.
3- 26 miles.
4- 28 miles.

666. Refer to Figure 27 above.

GIVEN: Associated Conditions . Fig. 27
Height above terrain . 7,500 ft.
Headwind . . . . 30 knots

What is the approximate glide distance?

Q-16 1- 9 miles.
2- 11 miles.
3- 13 miles.
4- 16 miles.

667. Refer to Figure 27 above.

GIVEN: Associated Conditions . Fig. 27
Height above terrain . 12,000 ft.
Headwind . . . . 20 knots

What is the approximate glide distance?

Q-16 1- 21 miles.
2- 23 miles.
3- 24 miles.
4- 26 miles.

668. Which statement is true relating to the effect of low level wind shear on airplane performance?

Q-16 1- A headwind which shears to a tailwind causes the airplane to pitch up.
2- A headwind which shears to a tailwind causes an initial increase in airspeed.
3- A tailwind which shears to a headwind causes the airplane to pitch up.
4- A tailwind which shears to a headwind causes an initial decrease in airspeed.

669. Which statement is true relating to the effect of low level wind shear on airplane performance?

Q-16 1- A tailwind which shears to a headwind causes an initial decrease in airspeed.
2- A tailwind which shears to a headwind causes the airplane to pitch down.
3- A headwind which shears to a tailwind causes an initial increase in airspeed.
4- A headwind which shears to a tailwind causes the airplane to pitch down.

670. Which statement is true relating to the effect of low level wind shear on airplane performance?

Q-16 1- A headwind which shears to a tailwind causes the airplane to pitch up.
2- A headwind which shears to a tailwind causes an initial decrease in airspeed.
3- A tailwind which shears to a headwind causes the airplane to pitch down.
4- A tailwind which shears to a headwind causes an initial decrease in airspeed.

671. Which airspeed would be the best to use to clear obstacles after takeoff?

Q-15 1- Best rate-of-climb speed.
2- Best angle-of-climb speed.
3- Minimum safe climb speed.
4- Minimum controllable climb speed.

672. Which speed will provide the greatest gain in altitude over the shortest horizontal distance?

Q-15 1- Minimum controllable speed in a climb configuration.
2- Minimum safe climb speed.
3- Best angle-of-climb speed.
4- Best rate-of-climb speed.

673. Which statement is true concerning airplane speed symbols?

Q-15 1- Vfe means the speed for maximum stability.
2- Vle means the maximum safe landing speed.
3- Vy means the best angle-of-climb speed.
4- Vso means the stalling speed in the landing configuration.

674. Which statement is true concerning airplane speed symbols?

Q-15 1- Vso; power-on stalling speed, gear and flaps retracted.
2- Vle; minimum landing safety speed.
3- Vy; best angle-of-climb speed.
4- Vx; best angle-of-climb speed.

675. Which statement concerning airplane speed symbols is correct?

Q-15 1- Vso is the power-on stalling speed with the gear and flaps retracted.
2- Vfe is the maximum flap-extended speed.
3- Vno is the never-exceed speed.
4- Vy is the best angle-of-climb speed.

676. The symbol which means the stalling speed or the minimum steady flight speed in a specified configuration is

Q-15 1- Va.
2- Vs.
3- Vsl.
4- Vso.

677. Which statement is true, if during a level coordinated turn the load factor was kept constant?

Q-17 1- A decrease in airspeed results in an increase in radius.
2- An increase in airspeed results in an increase in radius.
3- An increase in airspeed results in a decrease in radius.
4- An increase in airspeed would result in the same radius.

678. If, during a level turn, the rate of turn is kept constant, an increase in airspeed will result in a

Q-17 1- decrease in centrifugal force.
2- constant load factor regardless of changes in angle of bank.
3- need to decrease angle of bank to maintain the same radius of turn.
4- need to increase angle of bank to maintain the same radius of turn.

679. During a turn, if the angle of bank is steepened and at the same time the airspeed is decreased, a pilot can expect the radius of turn to

Q-17 1- decrease and rate of turn to increase.
2- decrease and rate of turn to decrease.
3- increase and rate of turn to increase.
4- increase and rate of turn to decrease.

680. If runway length permits, a pilot on an approach when anticipating a headwind to shear to a tailwind should consider

Q-16 1- increasing flap setting and decreasing speed.
2- increasing flap setting and increasing speed.
3- reducing flap setting and decreasing speed.
4- reducing flap setting and increasing speed.

681. During departure, under conditions of suspected low level wind shear, a sudden decrease in headwind will cause

Q-16 1- a loss in airspeed equal to the decrease in wind velocity.
2- a gain in airspeed equal to twice the amount of decrease in wind velocity.
3- a loss in airspeed equal to twice the amount of decrease in wind velocity.
4- a gain in airspeed equal to the decrease in wind velocity.

682. If an unusually high rate of climb is encountered during departure, under conditions of suspected low level wind shear, the pilot should

Q-16 1- not trim out control forces with trim control, but should decrease airspeed.
2- not trim out control forces with trim control, but should increase airspeed.
3- trim out control forces with trim control, and increase airspeed.
4- trim out control forces with trim control, and decrease airspeed.

683. If the decision is made to take off when the presence of low level wind shear is suspected, the pilot should

Q-16 1- use a minimum rate of climb and a speed well below maneuvering speed.
2- use a minimum rate of climb and increased speed.
3- determine the best direction for climbout, and request an appropriate ATC clearance.
4- use a maximum rate of climb and avoid turns.

684. During departure when low level wind shears to a tailwind or rapidly decreasing headwind, aircraft performance will

Q-16 1- increase.
2- decrease.
3- remain unchanged.
4- initially increase, then decrease.

MAXIMUM CLIMB

CLIMB SPEED

ASSOCIATED CONDITIONS:

POWER	MAXIMUM CONTINUOUS
WEIGHT	3400 POUNDS
GEAR	UP
FLAPS	UP

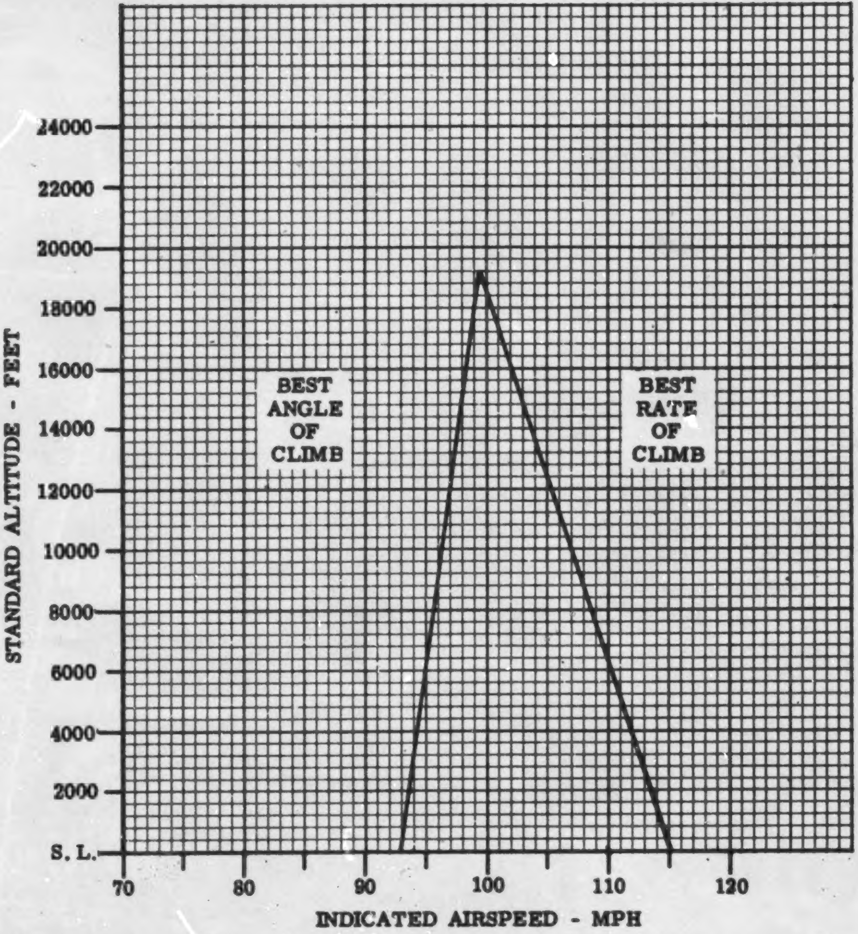


Figure 28

685. Use Figure 28.

GIVEN: Associated Conditions . . Fig. 28
Standard altitude . . . . 8,800 ft.

What indicated airspeed would result in the greatest increase in altitude in a unit of time?

Q-21
1- 95 MPH.
2- 96 MPH.
3- 106 MPH.
4- 108 MPH.

686. Use Figure 28.

GIVEN: Associated Conditions . . Fig. 28
Standard altitude . . . . 7,200 ft.

What indicated airspeed would result in the greatest increase in altitude in a unit of time?

Q-21
1- 94 MPH.
2- 95 MPH.
3- 109 MPH.
4- 110 MPH.

687. Use Figure 28.

GIVEN: Associated Conditions . . Fig. 28
Standard altitude . . . . 5,200 ft.

What indicated airspeed would result in the greatest increase in altitude in a unit of time?

Q-21
1- 94 MPH.
2- 95 MPH.
3- 109 MPH.
4- 111 MPH.

688. Use Figure 28.

GIVEN: Associated Conditions . . Fig. 28
Standard altitude . . . . 6,000 ft.

What indicated airspeed would result in the greatest increase in altitude for a given distance?

Q-21
1- 93 MPH.
2- 95 MPH.
3- 112 MPH.
4- 113 MPH.

689. Use Figure 28.

GIVEN: Associated Conditions . . Fig. 28
Standard altitude . . . . 11,600 ft.

What indicated airspeed would result in the greatest increase in altitude for a given distance?

Q-21
1- 97 MPH.
2- 99 MPH.
3- 105 MPH.
4- 106 MPH.

690. Use Figure 28.

GIVEN: Associated Conditions . . Fig. 28
Standard altitude . . . . 3,200 ft.

What indicated airspeed would result in the greatest increase in altitude for a given distance?

Q-21
1- 92 MPH.
2- 94 MPH.
3- 112 MPH.
4- 113 MPH.

691. Use Figure 28.

GIVEN: Associated Conditions . . Fig. 28
Standard altitude . . . . 6,400 ft.

What indicated airspeed would result in the greatest increase in altitude for a given distance?

Q-21
1- 95 MPH.
2- 97 MPH.
3- 109 MPH.
4- 110 MPH.

692. Use Figure 28.

GIVEN: Associated Conditions . . Fig. 28
Standard altitude . . . . 8,800 ft.

What indicated airspeed would result in the greatest increase in altitude for a given distance?

Q-21
1- 94 MPH.
2- 96 MPH.
3- 108 MPH.
4- 110 MPH.

USEFUL LOAD WEIGHTS AND MOMENTS

FUEL LEADING EDGE TANKS ARM 75					
Gallons	Weight	Moment	Gallons	Weight	Moment
5	30	23	45	270	203
10	60	45	49	294	221
15	90	68	55	330	248
20	120	90	60	360	270
25	150	113	65	390	293
30	180	135	70	420	315
35	210	158	75	450	338
40	240	180	80	480	360

OCCUPANTS				
Front Seats ARM 85		Rear Seats		
			Fwd. Position ARM 121	Aft Position ARM 136
Weight	Moment	Weight	Moment	Moment
120	102	120	145	163
130	111	130	157	177
140	119	140	169	190
150	128	150	182	204
160	136	160	194	218
170	145	170	206	231
180	153	180	218	245
190	162	190	230	258
200	170	200	242	273

OIL ARM 25		
Quarts	Weight	Moment
12	23	6

EMPTY WEIGHT DATA		
OIL NOT INCLUDED	Empty Weight (Lbs.)	Empty Weight Moment (/100)
Certificated Weight	2110	1652

BAGGAGE ARM 150	
Weight	Moment
10	15
20	30
30	45
40	60
50	75
60	90
70	105
80	120
90	135
100	150
110	165
120	180
130	195
140	210
150	225
160	240
170	255
180	270
190	285
200	300
210	315
220	330
230	345
240	360
250	375
260	390
270	405

NOTE: All moments are equal to $\frac{\text{weight X arm}}{100}$

GROSS WEIGHT MOMENT LIMITS

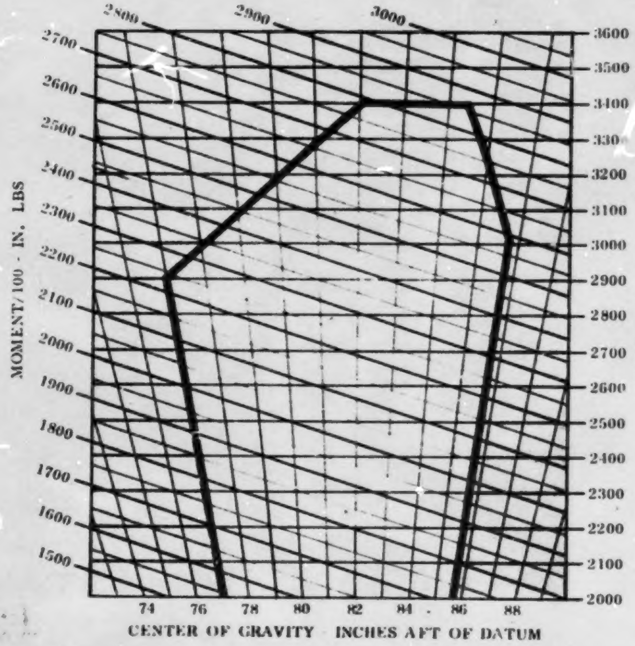


Figure 29

693. Refer to the loading data, Figure 29, and assume that an airplane is loaded as follows:

Front - 1st person . 165 lbs.
2nd person . 150 lbs.
Rear (Aft position) - 1st person . 135 lbs.
2nd person . 160 lbs.
Baggage . . . . 150 lbs.
Oil . . . . Full
Fuel - Leading edge tanks . 65 gals.

From the data given, it can be determined that the airplane is loaded

Q-23
1- 507 lbs. under allowable gross weight; CG 86.2" aft of datum.
2- 140 lbs. under allowable gross weight; CG 86.2" aft of datum.
3- 117 lbs. under allowable gross weight; CG located outside forward limits.
4- 117 lbs. under allowable gross weight; CG located outside aft limits.

694. Refer to the loading data, Figure 29, and assume an airplane is loaded as follows:

Front - 1st person . 190 lbs.
2nd person . 175 lbs.
Rear (Fwd position) - 1st person . 160 lbs.
2nd person . 180 lbs.
Baggage . . . . 100 lbs.
Oil . . . . Full
Fuel - Leading edge tanks . 60 gals.

From the data given, it can be determined that the airplane is loaded

Q-23
1- 125 lbs. under allowable gross weight; CG 84.9" aft of datum.
2- 102 lbs. under allowable gross weight; CG located outside aft limits.
3- 102 lbs. under allowable gross weight; CG located outside forward limits.
4- 162 lbs. under allowable gross weight; CG 84.9" aft of datum.

695. Refer to the loading data, Figure 29, and assume that an airplane is loaded as follows:

Front - 1st person . 160 lbs.
2nd person . 156 lbs.
Rear (Aft position) - 1st person . 130 lbs.
2nd person . 147 lbs.
Baggage . . . . 50 lbs.
Oil . . . . Full
Fuel - Leading edge tanks . 75 gals.

From the data given, it can be determined that the airplane is loaded

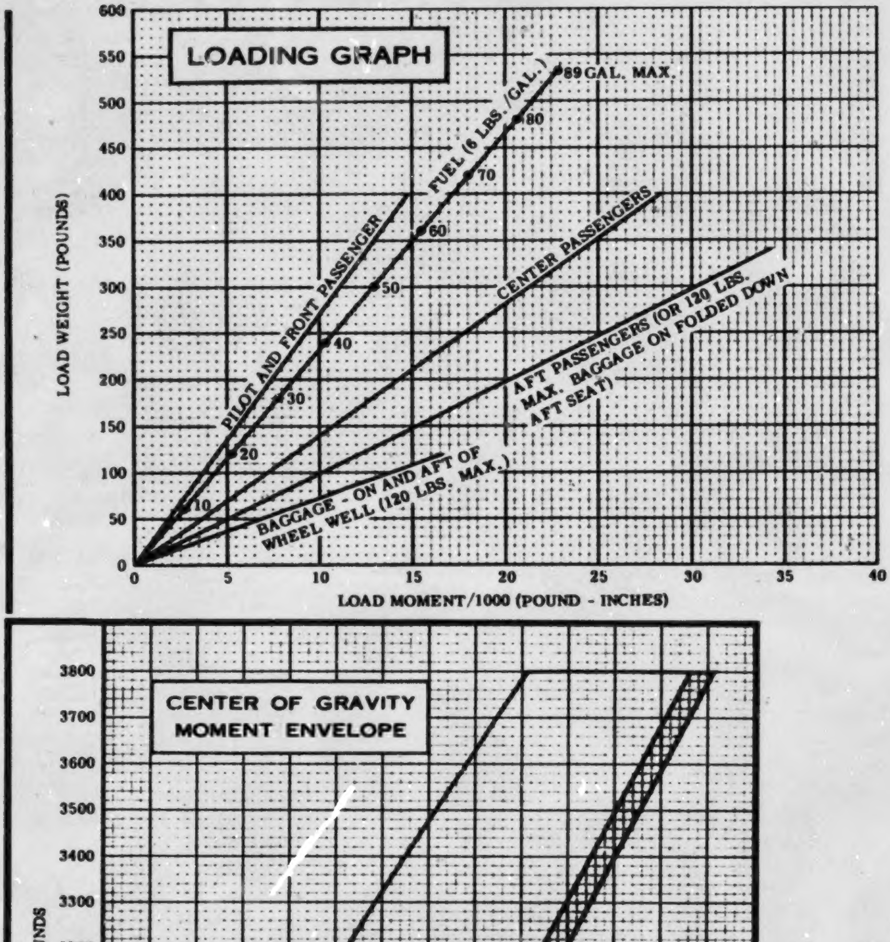
Q-23
1- 156 lbs. under allowable gross weight; CG 84" aft of datum.
2- 163 lbs. under allowable gross weight; CG 82" aft of datum.
3- 174 lbs. under allowable gross weight; CG 84.1" aft of datum.
4- 174 lbs. under allowable gross weight; CG located outside aft limits.

696. Refer to the loading data, Figure 29, and assume an airplane is loaded as follows:

Front - 1st person . 150 lbs.
2nd person . 146 lbs.
Rear (Fwd position) - 1st person . 170 lbs.
2nd person . 175 lbs.
Baggage . . . . 110 lbs.
Oil . . . . Full
Fuel - Leading edge tanks . 75 gals.

From the data given, it can be determined that the airplane is loaded

Q-23
1- 56 lbs. under allowable gross weight; CG within aft limits.
2- 66 lbs. under allowable gross weight; CG located outside aft limits.
3- 66 lbs. under allowable gross weight; CG 84.5" aft of datum.
4- 76 lbs. under allowable gross weight; CG 84.9" aft of datum.



NOTE

Loadings within clear area are satisfactory for takeoff and landing. In shaded area, takeoff is approved, but computation of loading after estimated fuel burn-off must be made to verify that c.g. will remain within overall envelope for landing.

Figure 30

697. Use Figure 30.

GIVEN:

Empty weight moment	90.5
Empty wt.(oil not included)	2190.0 lbs.
Oil	8 qts.
Oil moment	-0.2
Pilot & front seat passenger	320.0 lbs.
Center passengers	340.0 lbs.
Aft passengers	340.0 lbs.
Baggage	100.0 lbs.
Fuel	85.0 gals.

If the airplane were loaded before takeoff as shown above, what would the total weight and moment be after 70.0 gallons of fuel have been used during flight?

Q-23
1- Weight 3395.0; moment 178.6.
2- Weight 3395.0; moment 196.8.
3- Weight 3800.0; moment 196.8.
4- Weight 3800.0; moment 178.6.

698. Use Figure 30.

GIVEN:

Empty weight moment	93.2
Empty wt.(oil not included)	2260.0 lbs.
Oil	8 qts.
Oil moment	-0.2
Pilot & front seat passenger	360.0 lbs.
Center passengers	340.0 lbs.
Aft passengers	320.0 lbs.
Baggage	100.0 lbs.
Fuel	70.0 gals.

If the airplane were loaded before takeoff as shown above, what would the total weight and moment be after 60.0 gallons of fuel have been used during flight?

Q-23
1- Weight 3455.0; moment 178.6.
2- Weight 3455.0; moment 194.3.
3- Weight 3800.0; moment 178.6.
4- Weight 3800.0; moment 194.3.

699. Use Figure 30.

GIVEN:

Empty weight moment	92.5
Empty wt.(oil not included)	2340.0 lbs.
Oil	8 qts.
Oil moment	-0.2
Pilot & front seat passenger	280.0 lbs.
Center passengers	260.0 lbs.
Aft passengers	220.0 lbs.
Baggage	110.0 lbs.
Fuel	80.0 gals.

If the airplane were loaded before takeoff as shown above, what would the total weight and moment be after 40.0 gallons of fuel have been used during flight?

Q-23
1- Weight 3465.0; moment 179.4.
2- Weight 3690.0; moment 179.4.
3- Weight 3465.0; moment 168.9.
4- Weight 3690.0; moment 168.9.

700. Use Figure 30.

GIVEN:

Empty weight moment	91.6
Empty wt.(oil not included)	2267.0 lbs.
Oil	8 qts.
Oil moment	-0.2
Pilot & front seat passenger	240.0 lbs.
Center passengers	225.0 lbs.
Aft passengers	340.0 lbs.
Baggage	120.0 lbs.
Fuel	60.0 gals.

If the airplane were loaded before takeoff as shown above, what would the total weight and moment be after 40.0 gallons of fuel have been used during flight?

Q-23
1- Weight 3327.0; moment 172.3.
2- Weight 3327.0; moment 182.9.
3- Weight 3552.0; moment 172.3.
4- Weight 3552.0; moment 182.9.

701. Use Figure 30.

GIVEN:

Empty weight moment	93.5
Empty wt.(oil not included)	2267.0 lbs.
Oil	8 qts.
Oil moment	-0.2
Pilot & front seat passenger	350.0 lbs.
Center passengers	370.0 lbs.
Aft passengers	300.0 lbs.
Baggage	120.0 lbs.
Fuel	60.0 gals.

If the airplane were loaded before takeoff as shown above, what would the total weight and moment be after 50.0 gallons of fuel have been used during flight?

Q-23
1- Weight 3482.0; moment 181.8.
2- Weight 3482.0; moment 195.0.
3- Weight 3767.0; moment 195.0.
4- Weight 3767.0; moment 181.8.

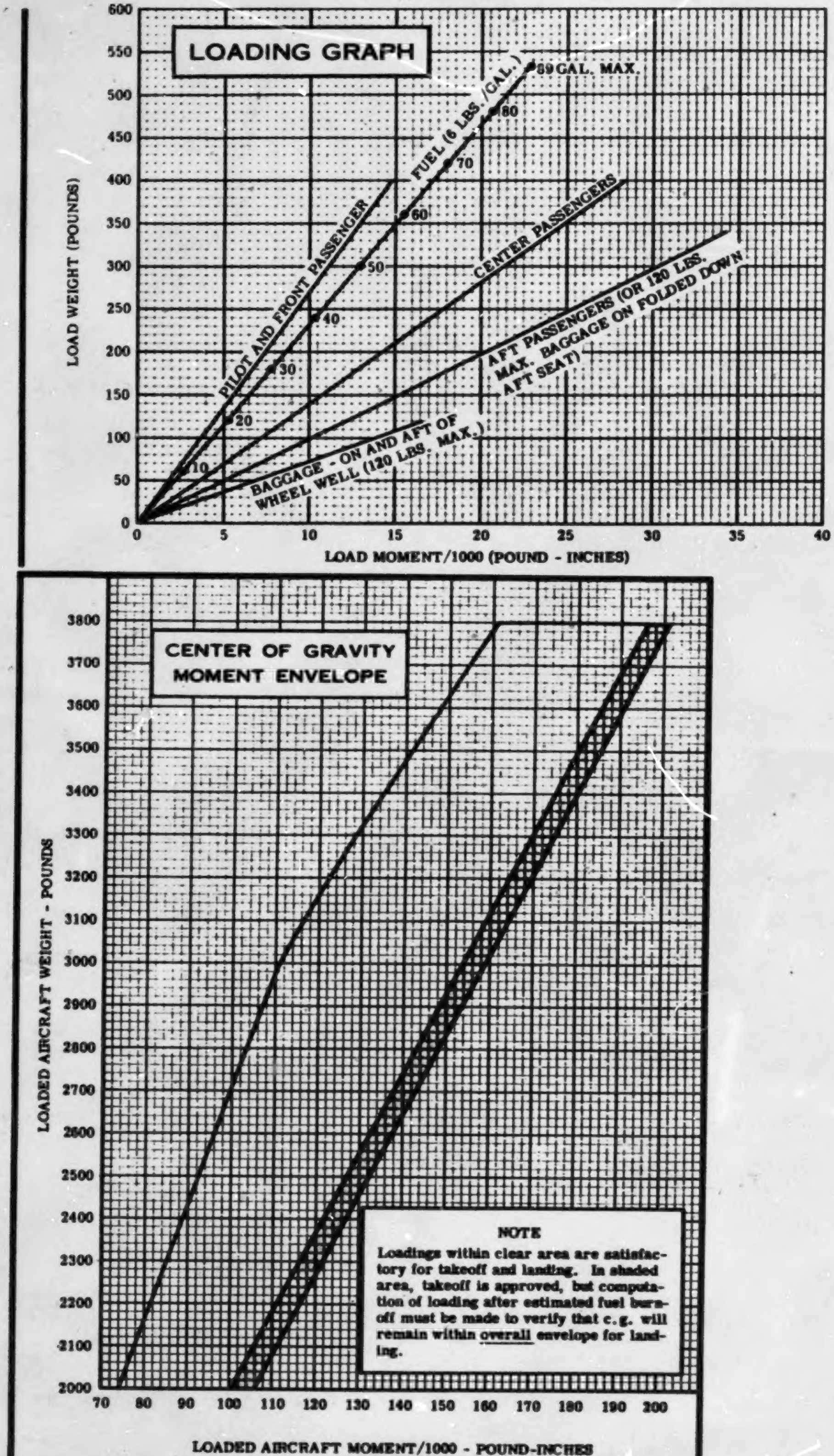
702. Use Figure 30.

GIVEN:

Empty weight moment	90.2
Empty wt.(oil not included)	2276.0 lbs.
Oil	8 qts.
Oil moment	-0.2
Pilot & front seat passenger	250.0 lbs.
Center passengers	370.0 lbs.
Aft passengers	330.0 lbs.
Baggage	120.0 lbs.
Fuel	70.0 gals.

If the airplane were loaded before takeoff as shown above, what would the total weight and moment be after 60.0 gallons of fuel have been used during flight?

Q-23
1- Weight 3421.0; moment 192.9.
2- Weight 3421.0; moment 177.2.
3- Weight 3766.0; moment 177.2.
4- Weight 3766.0; moment 192.9.



NOTE

Loadings within clear area are satisfactory for takeoff and landing. In shaded area, takeoff is approved, but computation of loading after estimated fuel burn-off must be made to verify that c.g. will remain within overall envelope for landing.

Figure 31

703. Use Figure 31.

GIVEN:

Empty weight moment	99.7
Empty wt.(oil not included)	2288.0 lbs.
Oil	8 qts.
Oil moment	-0.2
Pilot & front seat passenger	330.0 lbs.
Center passengers	290.0 lbs.
Aft passengers	170.0 lbs.
Baggage	120.0 lbs.
Fuel	70.0 gals.

If the airplane were loaded before takeoff as shown above, what would the total weight and moment be after 60.0 gallons of fuel have been used during flight?

Q-23 1- Weight 3273.0; moment 184.5.
2- Weight 3273.0; moment 168.8.
3- Weight 3618.0; moment 184.5.
4- Weight 3618.0; moment 168.8.

704. Use Figure 31.

GIVEN:

Empty weight moment	98.2
Empty wt.(oil not included)	2306.0 lbs.
Oil	8 qts.
Oil moment	-0.2
Pilot & front seat passenger	340.0 lbs.
Center passengers	340.0 lbs.
Aft passengers	260.0 lbs.
Baggage	60.0 lbs.
Fuel	65.0 gals.

If the airplane were loaded before takeoff as shown above, what would the total weight and moment be after 50.0 gallons of fuel have been used during flight?

Q-23 1- Weight 3411.0; moment 173.1.
2- Weight 3411.0; moment 186.3.
3- Weight 3696.0; moment 173.1.
4- Weight 3696.0; moment 186.3.

705. Use Figure 31.

GIVEN:

Empty weight moment	88.0
Empty wt.(oil not included)	2140.0 lbs.
Oil	8 qts.
Oil moment	-0.2
Pilot & front seat passenger	400.0 lbs.
Center passengers	350.0 lbs.
Aft passengers	310.0 lbs.
Baggage	120.0 lbs.
Fuel	80.0 gals.

If the airplane were loaded before takeoff as shown above, what would the total weight and moment be after 50.0 gallons of fuel have been used during flight?

Q-23 1- Weight 3515.0; moment 183.1.
2- Weight 3515.0; moment 196.3.
3- Weight 3800.0; moment 196.3.
4- Weight 3800.0; moment 183.1.

706. Use Figure 31.

GIVEN:

Empty weight moment	93.6
Empty wt.(oil not included)	2310.0 lbs.
Oil	8 qts.
Oil moment	-0.2
Pilot & front seat passenger	400.0 lbs.
Center passengers	340.0 lbs.
Aft passengers	100.0 lbs.
Baggage	80.0 lbs.
Fuel	70.0 gals.

If the airplane were loaded before takeoff as shown above, what would the total weight and moment be after 35.0 gallons of fuel have been used during flight?

Q-23 1- Weight 3455.0; moment 162.6.
2- Weight 3455.0; moment 171.8.
3- Weight 3650.0; moment 162.6.
4- Weight 3650.0; moment 171.8.

707. Use Figure 31.

GIVEN:

Empty weight moment	92.6
Empty wt.(oil not included)	2290.0 lbs.
Oil	8 qts.
Oil moment	-0.2
Pilot & front seat passenger	340.0 lbs.
Center passengers	320.0 lbs.
Aft passengers	150.0 lbs.
Baggage	120.0 lbs.
Fuel	80.0 gals.

If the airplane were loaded before takeoff as shown above, what would the total weight and moment be after 40.0 gallons of fuel have been used during flight?

Q-23 1- Weight 3475.0; moment 170.0.
2- Weight 3475.0; moment 180.5.
3- Weight 3700.0; moment 170.0.
4- Weight 3700.0; moment 180.5.

708. Use Figure 31.

GIVEN:

Empty weight moment	91.6
Empty wt.(oil not included)	2270.0 lbs.
Oil	8 qts.
Oil moment	-0.2
Pilot & front seat passenger	340.0 lbs.
Center passengers	320.0 lbs.
Aft passengers	310.0 lbs.
Baggage	80.0 lbs.
Fuel	80.0 gals.

If the airplane were loaded before takeoff as shown above, what would the total weight and moment be after 50.0 gallons of fuel have been used during flight?

Q-23 1- Weight 3515.0; moment 190.0.
2- Weight 3515.0; moment 176.8.
3- Weight 3800.0; moment 190.0.
4- Weight 3800.0; moment 176.8.

709. Which of the following has the most significant effect on the indicated airspeed at which an airplane stalls?

Q-19
1- Flight altitude.
2- Atmospheric pressure.
3- Atmospheric temperature.
4- Airplane attitude.

710. An airplane in a steep-banked turn stalls at a higher airspeed than it does with the wings level because in the turn the

Q-18
1- critical angle of attack has decreased.
2- critical angle of attack is reached at a higher airspeed.
3- total lift has decreased.
4- effective thrust has decreased.

711. The angle of attack at which an airplane stalls

Q-18
1- will occur at smaller angles of attack flying downwind than when flying upwind.
2- is dependent upon the speed of the airflow over the wings.
3- is a function of speed and density altitude.
4- will remain constant regardless of gross weight.

712. What determines the angle of attack at which an airplane stalls?

Q-18
1- Design of the wing.
2- Load factor.
3- True airspeed.
4- Airplane gross weight.

713. To increase the rate of turn and at the same time decrease the radius, a pilot should

Q-17
1- shallow the bank and decrease airspeed.
2- steepen the bank and increase airspeed.
3- shallow the bank and increase airspeed.
4- steepen the bank and decrease airspeed.

714. If the airspeed was increased from 90 MPH to 135 MPH during a level 60° banked turn, the load factor would

Q-17
1- remain the same but the radius of the turn would decrease.
2- increase due to additional centrifugal force.
3- decrease and the radius of turn would increase.
4- remain the same but the radius of turn would increase.

715. Increasing the airspeed while maintaining a constant load factor during a level, coordinated turn would result in

Q-17
1- an increase in centrifugal force.
2- the same radius of turn.
3- a decrease in the radius of turn.
4- an increase in the radius of turn.

716. In coordinated flight for any specific bank, the faster the speed of the airplane the

Q-17
1- smaller the radius and the slower the rate of turn.
2- greater the radius and the faster the rate of turn.
3- smaller the radius and the faster the rate of turn.
4- greater the radius and the slower the rate of turn.

717. Which statement is correct with respect to rate and radius of turn for an airplane flown in a coordinated turn at a constant altitude?

Q-17
1- For any specific angle of bank and airspeed, the lighter the airplane the faster the rate and the smaller the radius of turn.
2- For a specific angle of bank and airspeed the rate and radius of turn will not vary.
3- The faster the true airspeed, the faster the rate and larger the radius of turn regardless of the angle of bank.
4- To maintain a steady rate of turn, the angle of bank must be increased as the airspeed is decreased.

718. In airplanes all stalls are caused by

Q-18 1- exceeding the critical angle of attack.
2- a loss of airspeed.
3- exceeding the critical angle of pitch.
4- misuse of the elevators.

719. Which statement is true relating to the factors which produce stalls?

Q-19 1- The stalling angle of attack depends upon the speed of the airflow over the wings.
2- The critical angle of attack is a function of the degree of bank.
3- To accelerate a stall will always produce a spin.
4- The stalling angle of attack is independent of the speed of airflow over the wings.

720. GIVEN:

Airplane weight . . . 5,000 lbs.
CG . . . . Station 75.0
Aft CG limit . . . . Station 75.5

How much weight could be added at Station 150.0 without exceeding the aft CG limit?

Q-23 1- 33.5 lbs.
2- 72.3 lbs.
3- 74.5 lbs.
4- 150.0 lbs.

721. Consider the following:

Aircraft weight . . . 4,000 lbs.
CG location . . . . . Station 70.0
Aft CG limit . . . . Station 70.5

How much weight could be added at Station 100.0 without exceeding the aft CG limit?

Q-23 1- 67.7 lbs.
2- 137.9 lbs.
3- 143.4 lbs.
4- 170.5 lbs.

722. The center of gravity of an airplane is computed along the

Q-23 1- vertical axis.
2- longitudinal axis.
3- horizontal axis.
4- lateral axis.

723. If all index units are positive when computing weight and balance the location of the datum would be at the

Q-23 1- trailing edge of the wing.
2- centerline of the main wheels.
3- nose, or out in front of the aircraft.
4- centerline of the nose or tailwheel depending on the type aircraft.

724. Consider the following:

Aircraft weight . . . 6,700 lbs.
CG location . . . . . 75" aft of datum

What is the new CG location if 230 lbs. of baggage are added at 145" aft of datum?

Q-23 1- 72.7".
2- 77.3".
3- 98.0".
4- 145.0".

725. Assume an airplane is loaded as follows:

Weight "A" - 155 lbs. @ 13" aft of datum
Weight "B" - 205 lbs. @ 90" aft of datum
Weight "C" - 85 lbs. @ 160" aft of datum

According to this information only, the CG would be located at

Q-23 1- 76.5" aft of datum.
2- 129.5" aft of datum.
3- 117.0" aft of datum.
4- 151.5" aft of datum.

726. Assume an airplane is loaded as follows:

Weight "A" - 200 lbs. @ 14" aft of datum
Weight "B" - 160 lbs. @ 80" aft of datum
Weight "C" - 125 lbs. @ 175" aft of datum

According to this information only, the CG would be located at

Q-23 1- 13.9" aft of datum.
2- 55.5" aft of datum.
3- 77.2" aft of datum.
4- 89.6" aft of datum.

727. Suppose the landing gear of an airplane moves rearward when retracting. Does this affect the CG?

Q-23
1- No; the CG location would remain the same.
2- Yes; but the CG movement would be unpredictable.
3- Yes; the CG would move aft.
4- Yes; the CG would move forward.

728. Assume an airplane is loaded as follows:

Weight "A" - 200 lbs. @ 10" aft of datum
Weight "B" - 100 lbs. @ 100" aft of datum
Weight "C" - 50 lbs. @ 250" aft of datum

According to this information only, the CG would be located at

Q-23
1- 68" aft of datum.
2- 70" aft of datum.
3- 85.7" aft of datum.
4- 157" aft of datum.

729. Assume an airplane is loaded as follows:

Weight "A" - 50 lbs. @ 200" aft of datum
Weight "B" - 150 lbs. @ 80" aft of datum
Weight "C" - 230 lbs. @ 30" aft of datum

According to this information only, the CG would be located at

Q-23
1- 6.7" aft of datum.
2- 67.2" aft of datum.
3- 7.2" aft of datum.
4- 72.0" aft of datum.

730. Consider the following:

Aircraft weight . . . . 5,000 lbs.
CG location . . . . . . Station 80.0
CG aft limit . . . . . Station 80.5

What is the maximum weight that could be added at Station 150.0 without exceeding the aft CG limit?

Q-23
1- 35.9 lbs.
2- 69.5 lbs.
3- 70 lbs.
4- 160.5 lbs.

731. The location of the center of gravity can always be found by

Q-23
1- subtracting total weight from total moments.
2- subtracting total moments from total weight.
3- dividing total weight by total moments.
4- dividing total moments by total weight.

732. If the landing gear on an airplane moves forward during retraction, the

Q-23
1- total moments will decrease.
2- total moments will remain the same.
3- total moments will increase.
4- center of gravity will remain the same.

733. Consider the following:

Aircraft weight . . . . 9,500 lbs.
CG location . . . . . . Station 90.0
Aft CG limit . . . . . Station 90.5

How much weight could be added at Station 120 without exceeding the aft CG limit?

Q-23
1- 30.0 lbs.
2- 61.0 lbs.
3- 110.5 lbs.
4- 161.0 lbs.

734. GIVEN:

Airplane weight . . . . 6,400 lbs.
CG location . . . . . . Station 80.0
Aft CG limit . . . . . Station 80.5

How much weight could be added at Station 150.0 without exceeding the aft CG limit?

Q-23
1- 5.0 lbs.
2- 46.0 lbs.
3- 69.5 lbs.
4- 70.0 lbs.

735. Assume an airplane is loaded as follows:

Weight "A" - 80 lbs. @ 200" aft of datum
Weight "B" - 160 lbs. @ 90" aft of datum
Weight "C" - 240 lbs. @ 60" aft of datum

According to this information only, the CG would be located at

Q-23
1- 9.3" aft of datum.
2- 12.8" aft of datum.
3- 93.3" aft of datum.
4- 128" aft of datum.

736. Consider the following:

Aircraft weight . . . 7,650 lbs.
CG location . . . . . 79" aft of datum

What is the new CG location if 250 lbs. of baggage are added at 150" aft of datum?

Q-23
1- 76.7" aft of datum.
2- 81.2" aft of datum.
3- 102.1" aft of datum.
4- 153.8" aft of datum.

737. GIVEN:

Aircraft weight . . . 2,800 lbs.
CG location . . . . . 40" aft of datum

If 80 lbs. of weight are added at 80" aft of datum, the new CG will be

Q-23
1- 37.6" aft of datum.
2- 38.9" aft of datum.
3- 41.1" aft of datum.
4- 42.5" aft of datum.

738. Consider the following:

Aircraft weight . . . 3,500 lbs.
CG location . . . . . Station 70.0
Aft CG limit . . . . Station 70.5

What is the maximum weight that could be added at Station 100.0 without exceeding the aft CG limit?

Q-23
1- 20.6 lbs.
2- 29.5 lbs.
3- 35.0 lbs.
4- 59.3 lbs.

739. GIVEN:

Airplane weight . . . 3,700 lbs.
CG location . . . . . Station 77
Aft CG limit . . . . Station 79

What is the maximum weight that could be added at Station 150.0 without exceeding the aft CG limits?

Q-23
1- 10.4 lbs.
2- 71.0 lbs.
3- 104.2 lbs.
4- 132.3 lbs.

740. Consider the following:

Aircraft weight . . . 5,750 lbs.
CG location . . . . . 77" aft of datum

What is the new CG location if 193 lbs. of baggage are added at 145" aft of datum?

Q-23
1- 59.0" aft of datum.
2- 69.8" aft of datum.
3- 79.2" aft of datum.
4- 89.0" aft of datum.

741. GIVEN:

Airplane weight . . . 2,930 lbs.
CG location . . . . . Station 80.0

What is the new CG location if 70 lbs. of baggage are added at Station 117?

Q-23
1- Station 88.0.
2- Station 80.8.
3- Station 117.0.
4- Station 197.0.

742. Consider the following:

Aircraft weight . . . 6,240 lbs.
CG location . . . . . 71" aft of datum

What is the new CG location if 210 lbs. of baggage are added at 140" aft of datum?

Q-23
1- 73.2" aft of datum.
2- 83.2" aft of datum.
3- 140.0" aft of datum.
4- 211.0" aft of datum.

743. Solve the following weight problem:

Weight "A" - 130 lbs. @ 14" aft of datum
Weight "B" - 120 lbs. @ 85" aft of datum
Weight "C" - 55 lbs. @ 190" aft of datum

The CG would be located how far aft of datum?

Q-23 1- .01".
2- 73.6".
3- 81.1".
4- 286.0".

744. Assume an airplane is loaded as follows:

Weight "A" - 180 lbs. @ 16" aft of datum
Weight "B" - 130 lbs. @ 70" aft of datum
Weight "C" - 75 lbs. @ 165" aft of datum

According to this information only, the CG would be located at

Q-23 1- 96.6" aft of datum.
2- 93.7" aft of datum.
3- 63.2" aft of datum.
4- 24.1" aft of datum.

745. Precession errors in the attitude indicator are induced by

R-01 1- increasing load factors.

2- gravitational forces.

3- 360° turns.

4- skidding turns or when accelerating and decelerating.

746. Deceleration error will be displayed on the attitude indicator by a false

R-01 1- nose-high indication.
2- nose-low indication.
3- bank to the right.
4- bank to the left.

747. In a coordinated turn the displacement of the turn needle

R-03 1- increases as angle of bank increases and airspeed decreases.

2- indicates the angle of bank.

3- remains constant for a 30° bank regardless of airspeed.

4- increases as angle of bank increases and airspeed increases.

748. If, without adjusting the altimeter setting, a flight is made from an area of high temperature into an area of low temperature and a constant altitude is maintained, the actual altitude of the airplane would be

R-04 1- lower than the altimeter indicates.

2- at a level below the standard datum plane.

3- at the same level as the altimeter indicates.

4- higher than the altimeter indicates.

749. If, without adjusting the altimeter setting, a flight is made from an area of low pressure into an area of high pressure and a constant altitude is maintained, the altimeter would indicate

R-04 1- higher than the actual altitude above sea level.

2- the actual altitude above ground level.

3- the actual altitude above sea level.

4- lower than the actual altitude above sea level.

750. If, without adjusting the altimeter setting, a flight is made from an area of low temperature into an area of high temperature and a constant altitude is maintained, the actual altitude of the airplane would be

R-04 1- at a level below the standard datum plane.

2- at the same level as the altimeter indicates.

3- higher than the altimeter indicates.

4- lower than the altimeter indicates.

751. If a constant indicated altitude and altimeter setting are maintained and the temperature increases, what would be the effect on the true altitude and pressure altitude?

R-04 1- Both true altitude and pressure altitude decrease.

2- True altitude remains the same while pressure altitude increases.

3- Both true altitude and pressure altitude increase.

4- True altitude increases while pressure altitude remains the same.

752. Assume an altimeter is set to 29.84" Hg and the correct altimeter setting is 30.00" Hg. If under these conditions a landing is made at an airport where the field elevation is 772 feet, the altimeter would indicate approximately

R-04
1- 160 feet.
2- 612 feet.
3- 772 feet.
4- 932 feet.

753. When operating at or above 18,000 feet MSL, the lowest usable flight level is determined by the

R-04
1- nonstandard temperature of the atmosphere.
2- atmospheric pressure in the area of operation.
3- atmospheric temperature in the area of operation.
4- nonstandard pressure of the atmosphere.

754. Which statement is true regarding usable flight levels when operating at or above 18,000 feet MSL?

R-04
1- When the reported altimeter setting decreases, the lowest usable flight level decreases.
2- When the reported altimeter setting increases, the lowest usable flight level increases.
3- When the reported altimeter setting decreases, the lowest usable flight level increases.
4- Regardless of the reported altimeter setting, the lowest usable flight level remains the same.

755. If a flight is made from an area of high pressure into an area of low pressure without adjusting the altimeter setting, the actual altitude of the airplane would be

R-04
1- at the same level as the altimeter indicates.
2- lower than the altimeter indicates.
3- higher than the altimeter indicates.
4- at a level below the standard datum plane.

756. Which statement is true regarding a sensitive altimeter?

R-04
1- The altimeter will assure safe terrain clearance if adjusted to the proper altimeter setting.
2- All aircraft flying at the same indicated altitude with identical altimeter settings will always be at the same true altitude.
3- If corrections are made for nonstandard temperature and pressure, the altimeter will give an accurate indication relative to terrain clearance.
4- The altimeter will indicate accurate altitude above terrain only when operating over flat terrain.

757. On a warmer than standard day the pressure level where the altimeter will indicate 4,000 feet would be

R-04
1- higher than it would under standard conditions.
2- the same as it would under standard conditions.
3- the same as it would under colder than standard conditions.
4- lower than it would under standard conditions.

758. If, without adjusting the altimeter setting, a flight is made from an area of high pressure into an area of lower pressure and a constant altitude is maintained, the altimeter would indicate

R-04
1- higher than the actual altitude above sea level.
2- lower than the actual altitude above sea level.
3- the actual altitude above sea level.
4- the actual altitude above ground level.

759. The location of the static vent which would provide the most accurate measurement of static pressure under variable flight conditions is one installed

R-08 1- in the pitot head which encounters relatively undisturbed air.
2- in the cockpit where it is not influenced by variable angle of attack.
3- on one side of the airplane and covered by a fine screen.
4- on each side of the airplane where the system will compensate for variation of airplane attitude.

760. Pitot static system errors are generally the greatest in which range of airspeed?

R-08 1- Maneuvering speed.
2- High airspeed.
3- Low airspeed.
4- Cruising airspeed.

761. One of the possible results of using the emergency alternate source of static pressure in an unpressurized airplane is that the

R-08 1- altimeter may indicate an altitude lower than the actual altitude being flown.
2- vertical velocity indicator may indicate a continuous descent.
3- altimeter may indicate an altitude higher than the actual altitude being flown.
4- airspeed indicator may indicate less than normal.

762. Which instrument would be affected by low pressure as indicated on the suction gauge?

R-07 1- Vertical velocity indicator.
2- Airspeed indicator.
3- Pressure altimeter.
4- Heading indicator.

763. Which airspeed would a pilot be unable to identify by the color coding of an airspeed indicator?

R-06 1- The maximum landing gear extended speed.
2- The maximum flap operating speed.
3- The never-exceed speed.
4- The maximum structural cruising speed.

764. If the static pressure ports iced over while descending from altitude, the airspeed indicator would read

R-06 1- zero.
2- high.
3- low.
4- correctly.

765. What speed is indicated by the lowest airspeed limit of the white arc on the airspeed indicator?

R-06 1- The power-off stalling speed with the gear and flaps in the landing position.
2- The power-on stalling speed with flaps and landing gear retracted.
3- The maximum speed at which to lower full flaps.
4- The maximum speed for flying in turbulent air or for abrupt maneuvers.

766. If the ram air input to the pitot head of the pitot system becomes blocked (drain hole open), the indicated airspeed will generally

R-06 1- decrease as altitude is increased.
2- remain unchanged.
3- increase as altitude is increased.
4- drop to zero.

767. If the ram air input and the drain hole of the pitot system becomes blocked, trapping the pressure in the system, the indicated airspeed will generally

R-06 1- vary excessively during level flight when the actual airspeed is varied.
2- decrease during climbs.
3- not change during level flight, even when the actual airspeed is varied by large power changes.
4- increase during descents.

768. If, while on the ground, a sensitive altimeter is set to 29.92" Hg and the ambient pressure is 29.92" Hg, the altimeter will indicate

R-04 1- density altitude.
2- zero.
3- field elevation.
4- true altitude.

769. To determine pressure altitude prior to takeoff, the altimeter should be set to

R-11
1- 29.92" Hg and the altimeter indication noted.
2- the current altimeter setting.
3- the field elevation and the pressure reading in the altimeter setting window noted.
4- the density altitude corrected for nonstandard temperature.

770. Pilots adjust their altimeters to the same altimeter setting because this

R-10
1- assures better vertical separation of aircraft.
2- affords accurate terrain clearance in mountainous areas.
3- eliminates the need to make inflight calculations of true altitude.
4- eliminates altimeter error due to position of static source.

771. Acceleration error will be displayed on the attitude indicator by a false

R-09
1- bank to the left.
2- nose-low indication.
3- nose-high indication.
4- bank to the right.

772. In the Northern Hemisphere, a magnetic compass will normally indicate a turn toward the

R-09
1- south when the airplane is accelerated on a north heading.
2- east if a right turn is entered from a south heading.
3- east if a right turn is entered from a north heading.
4- west if a right turn is entered from a north heading.

773. The deviation error of a magnetic compass varies

R-09
1- as the airplane accelerates.
2- according to the geographical location of the airplane.
3- on different headings.
4- the same for all airplanes on all headings.

774. The deviation error of a magnetic compass varies according to the

R-09
1- airspeed changes as the airplane accelerates.
2- geographic location of the airplane.
3- headings being flown, and is the same for all airplanes.
4- airplane electrical systems in use.

775. The compensating magnets of a magnetic compass should be adjusted

R-09
1- with the engine running.
2- with the engine shut down.
3- with the radio equipment "off."
4- on not less than 90° increments.

776. Deviation error of the magnetic compass is caused by

R-09
1- northerly turning error.
2- acceleration and deceleration.
3- the difference in location of true north and magnetic north.
4- certain metals and electrical systems within the airplane.

777. While in a shallow turn, the magnetic compass card

R-09
1- remains stationary and the airplane rotates around the compass card.
2- remains stationary in relation to the airplane throughout the turn.
3- continues to rotate in the same direction as the turn.
4- continues to rotate in a direction opposite to that of the turn.

778. What effect would using the alternate source of static pressure (which is vented inside an unpressurized airplane) have on the airplane instrument indications?

R-08
1- The vertical velocity indicator may indicate a continuous descent.
2- The turn needle may become inoperative.
3- The airspeed indicator may indicate slower than the actual airspeed being flown.
4- The altimeter may indicate higher than the actual altitude being flown.

779. The indicated airspeed on the final approach to a landing should be faster than normal when

U-02
1- atmospheric conditions are below standard.
2- landing at airports above 5,000 feet MSL.
3- making a power approach.
4- turbulent conditions exist.

780. Which statement is true regarding takeoffs during cold weather?

U-01
1- Engine cowl flaps should be closed during all cold weather operations.
2- The engine develops less power during cold weather, and therefore requires a longer takeoff distance.
3- An engine might develop more than the rated power, even though the RPM and MP limits are not exceeded.
4- The use of carburetor heat during takeoff in cold weather is not advisable under any circumstances.

781. With regard to the technique required for a crosswind correction on takeoff, a pilot should use

U-01
1- aileron pressure into the wind and initiate the lift-off at a normal airspeed in both tailwheel and nosewheel type airplanes.
2- rudder as required to maintain directional control, aileron pressure into the wind, and higher than normal lift-off airspeed in both conventional and nosewheel type airplanes.
3- right rudder pressure, aileron pressure into the wind, and higher than normal lift-off airspeed in both tricycle and conventional gear airplanes.
4- normal takeoff technique with a nosewheel type airplane, but use the technique described in response "2" when flying a tailwheel type airplane.

782. Reverted rubber hydroplaning (airplane skimming on wet runway) occurs when the pilot

U-01
1- locks the wheel brakes for a prolonged period.
2- overcontrols the rudder.
3- intermittently applies wheel brakes for short periods.
4- lands in an excessive crosswind.

783. Dynamic hydroplaning (airplane skimming on wet runway) occurs at

U-01
1- slow speeds with only a thin film of water on the runway.
2- high speeds with standing water on the runway.
3- slow speeds with standing water on the runway.
4- high speeds with only a film of water on the runway.

784. Viscous hydroplaning (airplane skimming on wet runway) occurs at

U-01
1- slow speeds with only a thin film of water on a runway with a smooth acting surface.
2- high speeds with standing water on the runway.
3- slow speeds with standing water on the runway.
4- only high speeds with a thin film of water on the runway.

785. The correct airspeed during a power approach to a short-field landing may be verified by

U-01
1- the ability to land on a predetermined spot.
2- the ability to maintain a constant angle of descent.
3- little or no floating during the landing flare.
4- immediate response to control usage.

786. Unless the engine manufacturer has recommended the use of low-lead gasoline, the use of this gasoline

P-05 1- should be avoided because of possible excessive engine wear.

2- is permissible and encouraged as a means to decrease air pollution.

3- should be limited because of its high power output.

4- is permissible only if the grade of fuel is the same as that recommended.

787. To minimize the side loads placed on the landing gear during touchdown the pilot should keep the

U-01 1- direction of motion of the airplane parallel to the runway.

2- downwind wing lowered sufficiently to eliminate the tendency for the airplane to drift.

3- longitudinal axis of the airplane parallel to the direction of its motion.

4- airplane headed sufficiently into the crosswind so that the direction of motion of the airplane is parallel to the runway.

788. Under normal conditions, a good crosswind landing on a runway requires that, at the moment of touchdown, the

U-01 1- direction of motion of the airplane be parallel to the runway.

2- direction of motion of the airplane and its longitudinal axis be parallel to the runway.

3- upwind wheel should be braked lightly to control the shifting center of gravity.

4- longitudinal axis of the airplane be parallel to the direction of motion of the airplane.

789. Assume an altimeter indicates an altitude of 2,100 feet MSL with an altimeter setting of 30.12" Hg. What is the approximate pressure altitude?

R-11 1- 2,300 feet.
2- 1,900 feet.
3- 2,080 feet.
4- 2,180 feet.

790. What is the relationship of density altitude (DA) to pressure altitude (PA) under standard temperature and pressure conditions at any given altitude?

R-11 1- DA gradually becomes a lower figure at higher altitudes.

2- DA gradually becomes a higher figure at higher altitudes.

3- DA is equal to PA.

4- DA is never equal to PA at any altitude.

791. Assume an altimeter indicates an altitude of 2,500 feet MSL with an altimeter setting of 29.52" Hg. What is the approximate pressure altitude?

R-11 1- 2,900 feet.
2- 2,540 feet.
3- 2,400 feet.
4- 2,100 feet.

792. Assume an altimeter indicates 5,500 feet MSL with an altimeter setting of 30.15" Hg. What is the approximate pressure altitude?

R-11 1- 5,730 feet.
2- 5,270 feet.
3- 5,477 feet.
4- 5,523 feet.

793. Assume an altimeter indicates an altitude of 3,500 feet MSL with an altimeter setting of 29.42" Hg. What is the approximate pressure altitude?

R-11 1- 4,000 feet.
2- 3,550 feet.
3- 3,450 feet.
4- 3,000 feet.

794. Which of the following procedures would minimize the possibility of gear up landings?

U-07
1- Requesting the control tower to verify that the landing gear is down.
2- Committing prelanding procedures to memory.
3- Checking for a gear horn sound by closing the throttle while on final approach.
4- Completing a prelanding checklist.

795. While taxiing a light, high-wing airplane during strong quartering tailwinds, the aileron control (wheel or stick) should be positioned

U-05
1- toward the direction from which the wind is blowing.
2- neutral at all times.
3- opposite the direction from which the wind is blowing.
4- neutral, except when making turns into the wind.

796. The maximum speed at which an airplane may be stalled, without imposing structural damage is called the

U-04
1- design maneuvering speed.
2- maximum structural cruising speed.
3- never-exceed speed.
4- power-off stalling speed with the gear and flaps in the landing position.

797. If severe turbulence is encountered, the airplane should be flown at

U-04
1- a speed equal to 1.2 times Vso.
2- any speed within the range of the green arc.
3- maximum structural cruising speed.
4- design maneuvering speed.

798. Which will occur if full deflection of flight controls is applied when the airplane is flown at or below design maneuvering speed?

U-04
1- The airplane will not stall as rapidly, giving an increase in safety.
2- The airplane will stall before the load factor becomes excessive.
3- Vertical gusts will decrease the angle of attack, thus preventing stalls.
4- The effectiveness of the controls will be increased.

799. A downwind turn near the ground is hazardous because it places the pilot in

U-03
1- a position where turbulence created by surface friction causes aircraft to stall.
2- an unfavorable position if a forced landing becomes necessary.
3- a position where it is difficult to maintain a constant altitude.
4- a position where unintentional stalls occur because of decreased groundspeed as the turn progresses.

800. A pilot's most immediate and vital concern in the event of complete power failure after becoming airborne on takeoff, is

U-03
1- gaining altitude quickly.
2- turning back to the takeoff field.
3- landing directly into the wind.
4- maintaining a safe airspeed.

801. Which statement is true regarding airplane weight and maximum distance glide speed under no wind conditions?

U-03
1- Glide distance for an airplane is a fixed value and does not change.
2- A change in airplane weight will not require a change in the maximum distance glide speed.
3- A decrease in airplane weight would require an increase in the maximum distance glide speed.
4- A decrease in airplane weight would require a decrease in maximum distance glide speed.

802. For takeoff, the blade angle of a controllable pitch propeller should be set at an angle which produces

U-08
1- equal pressure on each side of each blade.
2- a small angle of attack.
3- a large angle of attack.
4- high drag forces on that propeller.

803. Airplane metal propeller blade failure is usually caused by

U-08
1- warping of the blade after the blade was placed into service.
2- fatigue cracks that formed after the blade was placed into service.
3- material defects existing before the blade was put into service.
4- surface discontinuities existing before the blade was put into service.

804. To develop maximum power and thrust, a constant-speed propeller should be set to a blade angle which will produce a

U-08
1- large angle of attack and low RPM.
2- small angle of attack and high RPM.
3- large angle of attack and high RPM.
4- small angle of attack and low RPM.

805. If necessary to take off from a slushy runway, the freezing of landing gear mechanisms can be minimized by

U-07
1- retracting the gear immediately to prevent freezing.
2- delaying gear retraction.
3- increasing the airspeed to Vle before retraction.
4- recycling the gear.

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